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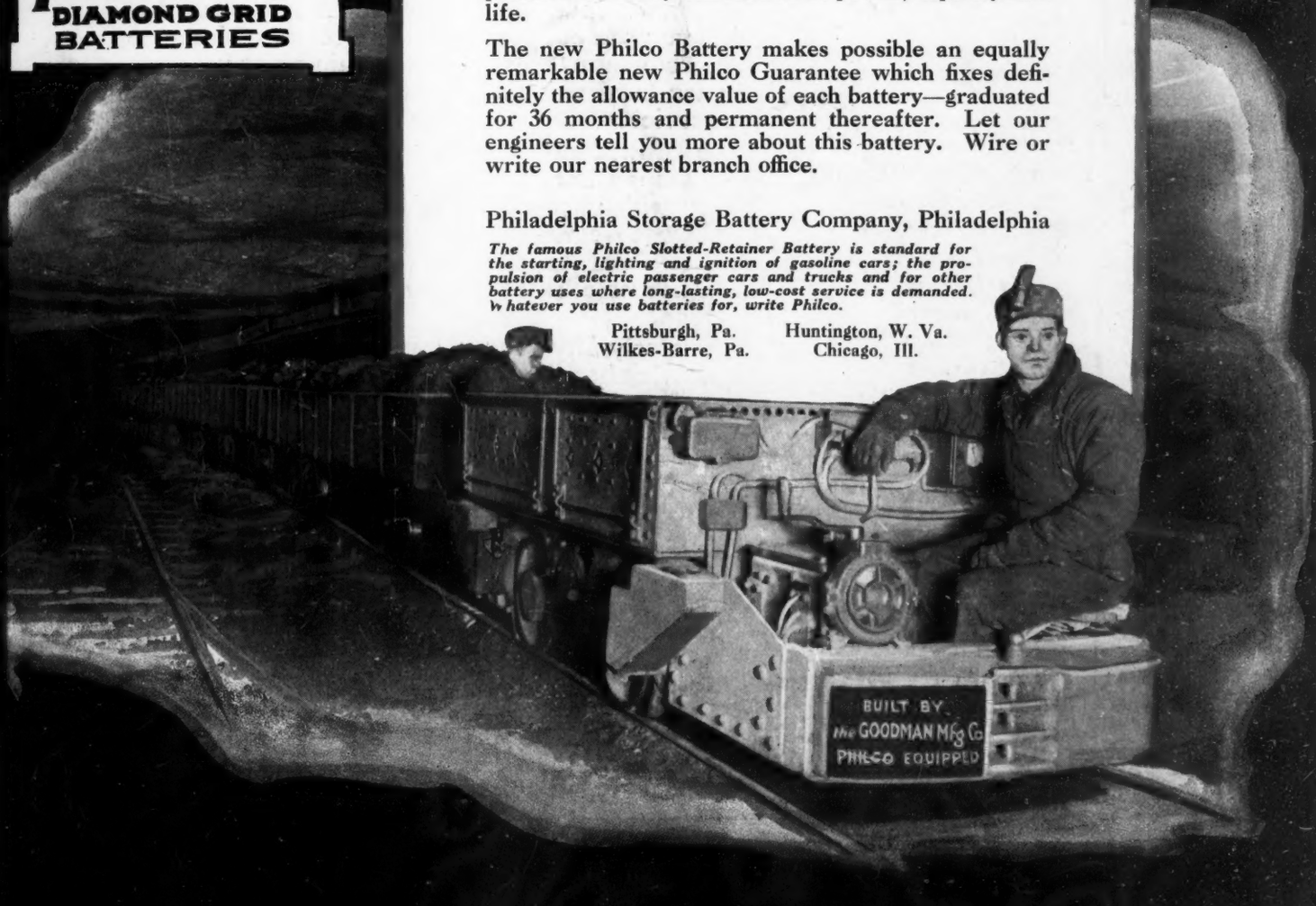

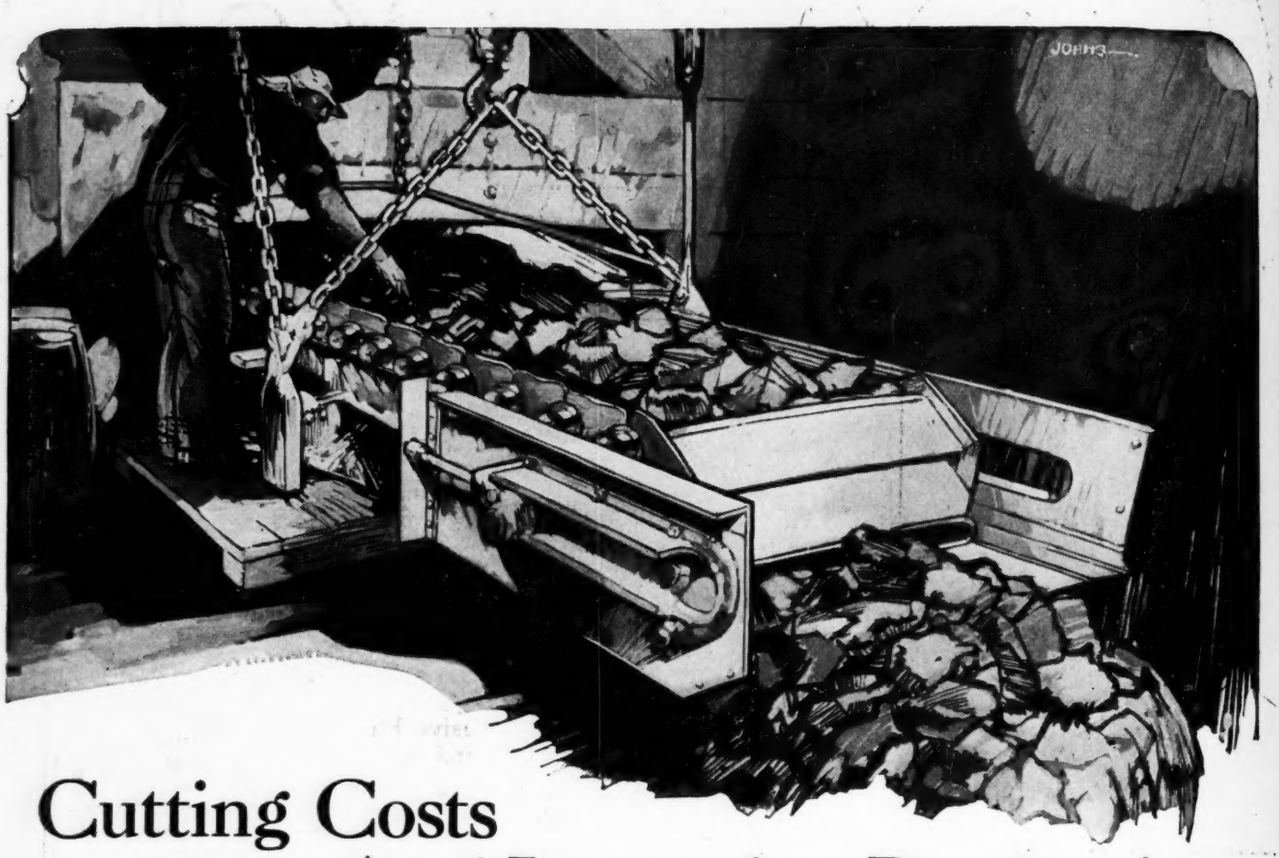

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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 23 NEW YORK, APRIL 26, 1923 Number 17

The Injustice of Impartiality

DISCUSSING "Bituminous Coal Problems" in the current issue of the *Harvard Business Review*, C. E. Bockus, president of the Clinchfield Coal Corporation, gives expression to many truths about the soft-coal industry in a frank and engaging manner. No coal operator in recent years has told so much in print about his problems and given the public such a comprehensive picture of the situation. Being an operator of non-union mines he does not stress though recognizing the complications that are introduced nationally by large-scale strikes in the organized fields. Overdevelopment and the effects of insufficient transportation are set down as basic problems in his field.

Mr. Bockus quite pertinently ventures the suggestion that in seeking remedies, as by the present U. S. Coal Commission, "it is going to be difficult to make consumers buy and store coal when they believe there is a falling market or to make producers sell for a lower price than they can obtain." He thinks that if some plan could be devised by which a regular contract shipper of coal had some advantage in his railroad-car supply over a "sporadic" shipper who comes into the field only when spot prices are high it would help. It is, in fact, the almost universal experience of the older, well-established companies, whose business has been built up on sound lines, that at the very times when their regular contract customers are in most urgent need of coal they are least able to ship the coal. When the occasional producer—the intermittent operator—finds a market for high-priced coal he demands and receives a share of the cars and takes a portion of the labor. The buyer, forced to take a pro-rata share from his regular supplier because of reduced car supply, must then purchase spot coal to fill his requirements.

This is the old story. The railroads meet it by assigning cars, thus getting the preference, and furnishing evidence that they know that a short coal supply is not the result of lack of coal but of cars and the transportation for which they, the railroads, are responsible. The public utilities regularly cover their needs for coal by contracts and they have repeatedly said that they would be satisfied if they could be sure of getting the coal they had bought. They too would like assigned cars. Mr. Bockus wonders whether his suggestion is "too much like 'assigned' cars, that anathema of most coal operators," and then answers for himself by stating that he would rather have the railroads get their coal in times of stress by assigning cars than by confiscating coal he has shipped to commercial customers. Is it too much to say that the railroads, without assigned cars, fill out the deficiences in their supply by *taking* spot coal, for they pay the invoice price on coal confiscated, and the commercial buyer *bids* for his share of the same spot coal? Of course, railroads have been charged with taking considerable pains to cut out of a yard of loads those cars for confiscation they had reason to believe were moving on low-priced contracts.

Those operators who will most heartily disagree with the idea that some prefence in transportation should be afforded contract shipments will be those who, unlike Mr. Bockus, would like to have their cake and eat it too. That is to say, there are many soft-coal producers who would favor a special supply of cars to protect their contract customers if on top of that they could have an allotment of cars in which to ship on the spot market. The practice of apportioning contract and spot shipments on the percentage of car supply is a case in point, though it finds some warrant from the fact that short working time increases costs of operation and thus may justify the attempt to obtain a higher average realization for the total product than would be afforded by contract prices. Mr. Bockus cites a particular instance where costs in December, because of short working time caused by lack of transportation, were 41c. per ton over May with full time, a factor in the business of the coal operator over which he has no control.

Subjects for Investigation

IF THE interest displayed by state legislatures is any indication of the public thirst for information about coal, the report and findings of the U. S. Coal Commission will be among the best sellers when given to the public. The latest—to come to our attention—is a bill introduced in the New York Assembly last week calling for a commission to investigate the coal industry and to ascertain why New Yorkers cannot get all the coal they want when they want it, and to report on how much coal New York needs, anyhow.

It is true that interest this summer may swing from coal to sugar, that in fact sugar is the real topic at Washington already. Later, if what the railroads prophesy as to transportation shortage next autumn comes true, there may be state commissions to inquire into speculation in railroad transportation. In passing it may be noted that it is going to be simpler for the purely political investigator to find a tail to which to attach his can in the case of sugar than in the case of coal. Some are blaming the tariff, others attribute soaring sugar prices to speculation in the established exchanges. Neither will suffice to explain away a situation in the coal industry.

It is not fair to lay all the politicians' interest in coal to politics. The people are greatly stirred up over the whole question and the local outbursts have an origin "back home." We believe the individual states would be best advised, however, to start their inquisitions into coal after they have the advantage of the national commission's findings. Thus not only would public money be saved but better results be assured. Since no generalization ever applies to Greater New York, an exception should be noted for Mayor Hylan's personal expedition into coal investigation, were it not that his questionnaires probably will be filed with the janitor.

Immigration in Relation To the Coal Industry

WHETHER or not a labor shortage is a good thing may be a timely subject for debate among employers in general industry but it is not going to trouble the soft-coal industry for some time. Judge Gary opened the debate in earnest a few days ago when he took occasion to oppose the present restrictive immigration laws and to urge a policy on the part of the country of taking in more foreign labor. He was perfectly frank in saying that the iron and steel industry needed more men and would like to have fresh supplies from abroad. Many other large employers hold the same views, for it is traditional in this country to draw raw labor from fresh stock.

Economists will long debate as to whether the admitted higher labor costs that will flow, and now are flowing, from a national policy of restricted immigration in a period of active demand are in the national interest. It seems quite certain now that there is a decided public opinion favoring the present plan, quite aside from what the labor interests think. The possibility of more complete and better assimilation of foreign labor already within our borders and the ultimate elevation of standards of living of these men is attractive and will have ample opportunity for trial before there is a change in national thought on this subject.

The anthracite industry is not overmanned. The high rate of production in these mines that has obtained since last September has been reached by hard work and no little overtime. With the soft-coal industry there is a different story. Production now is well above 10,000,000 tons per week, a figure that in a year will give more tons than the country has used save in three years—1917, 1918 and 1920. Yet the soft-coal mines are working but half time. There is labor at these mines sufficient to maintain 20 per cent more production and—at least on paper—labor to double the present rate.

In the face of this it does not seem possible that there can be a labor shortage at the bituminous-coal mines, yet such is possible locally. Just as there often is a car shortage and a car surplus at the same time, the country considered as a whole, so some operators may be short-handed while others have men idle. Districts such as Pittsburgh and Westmoreland, adjacent to active industrial centers, often experience a labor shortage while fields more isolated, as eastern Kentucky and parts of central Pennsylvania, have a surplus. Furthermore, a coal operator who obtains business that insures full running time, as railroad contracts, may be and often is short-handed at the same time that his neighbor, working a few days a week, has more men than he requires.

In certain respects coal-mine labor is fluid, as other labor. During the strike of 1922 union labor floated across the river from southern Illinois into western Kentucky, where the mines were the busiest they ever had been. During the dull period of 1921 union labor from the Pittsburgh district, where scales were fixed and inflexible and work scarce because of competition from mines with lowered wages, found employment in the Connellsville and other non-union fields near by, actually maintaining their residence in the meantime in the company houses in the union field. Operators in the Logan field of West Virginia often report an influx or exodus of labor, depending on the activity of the mines.

It is almost universally true that the older mines in a field have the greatest difficulty in maintaining their forces. Men seek the newer and easier places and during times of high prices find work in the small openings that do not hesitate to pay bonuses because not fearing to set precedents. Thus, despite the evident overmanning of the soft-coal industry, considered nationally, it is fully to be expected that if the present rate of output is maintained this summer, by autumn there will be the apparent anomaly of complaints of labor shortage from soft-coal mines. It must be apparent, however, that such a shortage cannot impair the ability of the industry to meet the country's demand for soft coal.

The Export Outlook

WHETHER the deadlock on the Ruhr is destined to result in such a coal famine in Europe, and indirectly in other countries, as will reopen in earnest the foreign market for exporters in this country depends largely if not entirely on how long the present situation endures. Information is lacking as to the degree to which the French have been able to revive coal production in that important field, but reports agree that no coal or coke is getting into Germany and that only driblets of coal and coke are finding their way west and north into France and Belgium.

Simultaneously with the stoppage of the Ruhr there is a definite revival of industry on the European continent, calling for more coal than last year, and with less available. France, Belgium, Germany and Italy first turned to Great Britain to fill the gap. The coal industry in that country, with 40,000 more workers than before the war, working at top speed, is able to produce at a rate between ten and fifteen million tons per year less than in 1913, when the output was 287,000,000 gross tons. The principal reason for this decline, of course, is the reduction from the 8- to the 7-hour day. Another factor is the lack of development, particularly of new mines. For the last five years the uncertainties of business and paucity of profits in the British coal trade have discouraged new investment in that field. It is a striking fact that with all the urgency of demand the exports of British coal in the first quarter of this year were less than in either the third or the fourth quarter of 1922.

There seems then to be little expectation of filling the widening gap between expanding requirements and decreased supply of coal abroad. The only other source competent to furnish the tonnage of coal that is, or will be, required is the United States. Buyers in Germany, Belgium, France, Italy and South America have been quietly covering their urgent needs on this side, at current market prices. So far there has been no precipitate rush for coal such as characterized 1920. A repetition of that avalanche of export business is not to be expected for two reasons: one is that the requirements for consumption over and above production on the other side is by no means so large as three years ago and the other is that shipping is abundant now and the demand will not be backed up by lack of vessels, as in 1919.

On the whole the outlook is for a steady summer market for producers of high-volatile coal on the Atlantic seaboard, with a distinct possibility that by autumn the export demand will assume large proportions.

Acid-Resisting Alloys for Use in Mine Water*

Analyses of Three Filtered Mine Waters—Montour No. 1 Water Contains Much Chlorine—Metals and Alloys That Will and Will Not Resist Corrosion—One Metal Gains in Weight—Some Lose by Pitting

By George M. Enos†
Pittsburgh, Pa.

WATER from coal mines frequently is acid, and by corroding pumps and pump parts, pipe lines and other mining equipment causes much trouble. Trouble of like kind is experienced also in metal mines, but to a smaller extent. Data and discussion on the corrosion of a large group of metals and alloys in the acid water from coal mines therefore should be of much value to mine operators and manufacturers of mining equipment.

The water from coal mines is rendered acid by the presence of free sulphuric acid. Usually associated with that acid are considerable quantities of the sulphates of iron and aluminum and smaller quantities of the sulphates of calcium, magnesium, sodium and potassium. Silica and chlorides generally are present. The ferrous and ferric sulphates and the free sulphuric acid found in mine water result from the action of air and water on the iron pyrite (FeS_2) and marcasite (white iron pyrite) with which the coal is associated.

The methods of determining the free and total acidity of the water have been described by Selvig[1] and Ratliff. Free acidity is defined as that due to the presence of free sulphuric acid. Total acidity is the acidity due to acid of that character plus the sulphates of iron and aluminum. Free acid may be present in any quantity from a trace to several thousand parts per million, and as much as 18,000 parts per million have been reported. Total acidity varies between wide limits but usually will be between 2,000 and 15,000 parts per million.

It is beyond the scope of this paper to review the extensive literature regarding corrosion or to discuss any of the theories regarding the manner in which it takes place. It may be well, however, to note some of the common ways in which mining equipment fails as the result of corroding processes. Unless protected, pipe lines of cast iron, wrought iron or steel are corroded rapidly by acid mine water.

Pipe May Corrode Away or Fail by Pitting

The failure may result from pitting or from a gradual wearing away or rusting of the pipe. A common point of failure is at a joint. In order to reduce the replacement of pipes to a minimum most companies operating mines having acid waters use wood-lined pipes. Lead- or porcelain-lined pipes or all-wood pipes having a bituminous coating also are used, but not so extensively as wood-lined pipes.

There are disadvantages in the use of any of these materials: (1) In order to carry any given volume of water the iron pipe must have a much larger outside diameter if it is to be wood-lined. (2) All-wood pipes do not have the required mechanical strength, and if the wires that bind the staves of the pipe together are corroded through, the section bursts and is useless.

*Published by permission of the Director, U. S. Bureau of Mines.

†Junior Metallurgist, Non-Ferrous Metals Section, U. S. Bureau of Mines.

[1]Selvig, W. A., and Ratliff, W. C., "The Nature of Acid Water from Coal Mines and the Determination of Acidity.": *Journal of Industrial Engineering Chemistry*, Vol. 14, No. 2, 1922, p. 125.

Note—Headpiece shows boxes at Calumet mine for testing effect of mine water in corroding metals and alloys.

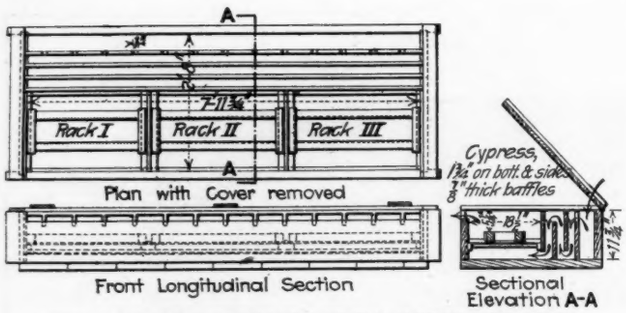


FIG. 1—BOXES IN WHICH METALS WERE TESTED

Metals were set in racks and mine water was passed through the boxes. The samples were only 2 x 6 in. and 16 gage where rolled materials and ¼ in. where cast.

(3) Lead- or porcelain-lined pipes are likely to cause trouble at the joints. The kind of pipe that should be used in acid mine water has not been determined beyond question, but so far the wood-lined pipe has been that most generally used.

The brasses or bronzes and the cast iron used in pump parts corrode fairly rapidly when exposed to the action of acid water. The valve seat, chamber, pump rod and other parts are subjected to the action of acid water flowing at a considerable velocity. It is fairly common practice to babbitt such parts as the chamber and piston, for babbitt resists the action of the water fairly well, although it is soft and abrades easily. In many mines it is not uncommon to have to change pump parts every month or six weeks, this renewal adding greatly to the pumping charge.

Less loss is caused by the corrosion of other equipment. Nevertheless it is important. Track frequently has to be replaced if exposed to the corroding action of acid water. A shovel may be ruined even if exposed to acid water for as short a time as over night.

Neutralization Underground Inexpedient

The question arises, Why cannot water be neutralized, thus saving the expense of frequent replacements of pump parts and pipe lines? Neutralization is practicable only above ground and here only after the water has already been handled by the pumping equipment. If it is necessary to use the water in the power plant, or if the products of neutralization—iron oxides—have a ready market the water can be neutralized with profit. Acid water cannot be neutralized profitably underground owing to the expense involved, not only in excavating the large sumps necessary for this purpose but also in lowering the lime rock, in filtering the effluent and in hoisting the resultant precipitate.

The U. S. Bureau of Mines, in co-operation with the industries, the American Society for Testing Materials,[2] and the Carnegie Institute of Technology,[3] has conducted several investigations into the corrosion of metals and alloys in acid mine water. In the tests already reported it was decided to test the metals and alloys as nearly as possible under service conditions—that is, to immerse the specimens in flowing mine water at the mines.

In the tests made in co-operation with the American Society for Testing Materials' test pieces of industrial grades of iron and steel, after weighing, were placed in racks, in suitable test boxes, and water from the mine was allowed to flow through the boxes at a carefully regulated rate. The test pieces measured 2 x 6 in., both 16- and 22-gage materials being subjected to the acid water. The pieces were frequently inspected and careful analyses of the water were made in the course of the test, which was made at the Calumet coal mine of the H. C. Frick Coke Co., Calumet, Pa.

In the second series of tests, made in co-operation with the Carnegie Institute of Technology, specimens of both ferrous and non-ferrous metals and alloys were employed. The non-ferrous alloys included brasses, bronzes, cupro-nickels, nickel-silvers and aluminum alloys. The ferrous alloys included only high-silicon cast irons, high-chromium steel and nickel-chromium-silicon steels. Nickel, copper, iron and aluminum also were included.

The test boxes were of an entirely different design from those in the first test, and the pieces tested were, for rolled materials, 2 x 6 in. and of 16-gage, and, for cast materials, 2 x 6 x ¼-in. The tests were conducted

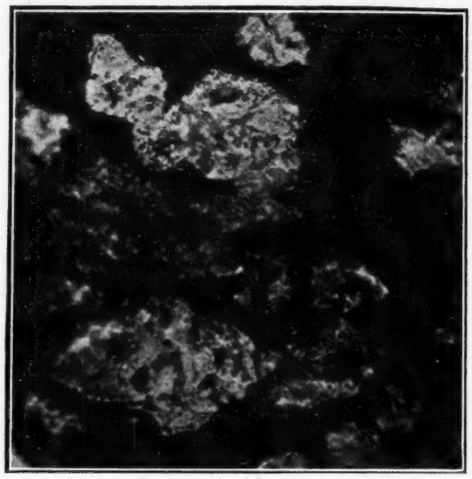


FIG. 2—CORRODED EDGE OF NAVAL BRASS SAMPLE

This alloy consists of copper, 60.40 per cent; zinc, 38.83 per cent; tin, 0.77 per cent. The light colored areas are what are known as Alpha crystals and they are relatively uncorroded. The surface is etched with $NH_4OH + H_2O_2$. Magnification 500 diameters.

at three mines in the western Pennsylvania coal region—namely, Montour No. 1 mine of the Pittsburgh Coal Co., at Southview, Washington County; Edna No. 2 mine of the Hillman Coal & Coke Co., at Wendel, Westmoreland County, and Calumet mine of the H. C. Frick Coke Co., at Calumet, Westmoreland County.

The weighed and measured pieces were totally immersed as in the previous test, the flow of water was carefully regulated and recorded, and inspections and analyses of mine waters were made at regular intervals.

In both series of tests the specimens were considered to have failed if the test piece had been corroded through or if the edge had been corroded to a depth of ¼ in. When the pieces failed they were removed either during the course of the test or at its conclusion. In either case they were cleaned and weighed, and the loss in weight was recorded. The headpiece of the article shows the arrangement of the boxes for the second test at the Calumet mine, and Fig. 1 shows the manner in which the boxes were constructed. Typical analyses of the mine waters from the three mines in which tests were made are given in Table I.

The first tests made at the Calumet mine showed that all the ordinary grades of iron and steel corroded

[2]Report of Sub-Committee 5 on total immersion tests, *Proceedings American Society for Testing Materials*, Vol. 21, 1921, pp. 157-194.

[3]Selvig, W. A., and Enos, George M., "Corrosion Tests on Metals and Alloys in Acid Waters from Coal Mines," Bulletin 4, Carnegie Institute of Technology, 1922; 71 pp.

TABLE I—TYPICAL ANALYSES OF FILTERED MINE WATERS

Constituent	Montour No. 1 Parts per Million (a)	Edna No. 2 Parts per Million (a)	Calumet Parts per Million (a)
SiO_2 (Silica)	160	129	67
Fe ++ (Ferrous iron)	1,216	516	11
Fe+++ (Ferric iron)	56	1,303	213
Al (Aluminum)	1,434	1,225	236
Ca (Calcium)	415	307	164
Mg (Magnesium)	9	122	191
K (Potassium)	373	332	0
Na (Sodium)	1,316	512	61
Cl (Chlorine)	590	37	17
SO_4 (Sulphate radicle)	11,898	11,750	2,229
Suspended matter (on unfiltered water) dried at 105deg. C.	26	19	43
Free acid (b) due to free sulphuric acid	1,200	1,940	340
Acidity (b) due to free sulphuric acid plus sulphates of iron and aluminum	11,070	13,280	2,950

(a) To convert parts per million to grains per U. S. gallon, multiply by 0.0583.
(b) Free acid and total acidity are reported in parts per million in terms of sulphuric acid.

rapidly, and the corrosion losses did not show any materials to be remarkedly superior to the others in resisting the action of acid mine water.

In the second tests the pieces showed a different loss in weight in each of the three mines, as, indeed, would be expected, although the relative order of loss was the same in nearly every case. In the water from the Edna No. 2 mine the losses were greatest. Table II gives the designation, composition and a number which expresses the relative loss in weight of the pieces exposed to the action of Edna No. 2 mine water. This number is based on the daily loss in weight expressed in milligrams per square centimeter of exposed surface.[4] The analyses of the metals in Table II are those given by the co-operating companies wherever they are marked with the notation (*a*).

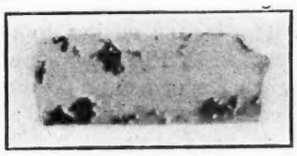


FIG. 3—CAST MANGANESE-ALUMINUM ALLOY

Shows deep pitting. Alloy consists of manganese, 1.81 per cent and aluminum. Unetched; magnification two diameters.

It was found that none of the brasses tested would resist the action of the acid mine water. Fig. 2 shows the corrosion edge of a brass of the Muntz metal type. The manganese brasses have a lower loss number, but on account of the rapid formation of a brittle copper-rich coating, they probably are but little better than ordinary brasses for resisting attack by mine water.

As bronzes have been used so extensively in pump parts, their losses from corrosion are of particular interest. It will be noted that of seven typical bronzes, five have a relatively low loss number. As physical properties may be the determining factor in choosing material for pump parts, it is not possible to say which is the best bronze to use in such cases, but it would seem that from the corrosion viewpoint the leaded bronzes are better adapted for such parts.

The cupro-nickels and nickel-silvers all show relatively high losses, and cannot be considered as having much value for use in acid mine water. Aluminum and aluminum alloys have a low corrosion loss number, but are of no value in acid mine water on account of the extreme rapidity with which they pit and the depth of the pitting. An example of pitting in a cast manganese-aluminum alloy is shown in Fig. 3.

[4]When 0 is used to denote the relative loss, it is understood to mean a corrosion loss of less than 0.5 mg. per square centimeter per day. The exact average loss figures in mg. per square centimeter per day for the Edna No. 2 mine are: High-silicon cast iron B, 0.00374; rolled rustless steel A, 0.00015; rolled rustless steel B, 0.00074; rolled high-chromium steel, 0.00030; rolled nickel, 0.00299, and rolled nichrome, 0.01812.

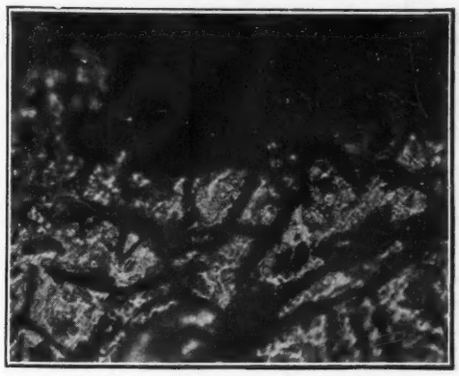


FIG. 4—CORROSION EDGE OF HIGH-SILICON CAST IRON A

Alloy consists of silicon, 14.5 per cent; carbon, 1.45 per cent; iron and minor impurities, the remainder. Surface is etched with $HNO_3 + HF$. Magnification 300 diameters.

There is a marked difference in the corrosion loss numbers of the high-silicon cast irons tested, which probably is due to the difference in the methods of melting and the difference in carbon content. Fig. 4 shows the corrosion edge of the high-silicon cast iron *A*.

The high-chromium steel and the chromium-nickel-silicon steels have a very small corrosion loss, and it would seem that for mining equipment which could be made of steel, either of these two materials could be used.

Pure nickel shows a very small loss in the Edna No. 2 mine water, but the loss was considerable in the other mine waters in which tests were made. Nichrome had a very small loss in all the waters. The group of copper-lead alloys had neither a high nor low loss number, as did monel metal and for certain purposes these alloys might find considerable use in acid mine water. A peculiar feature in connection with a 96-per cent lead alloy which was tested was the fact that it actually gained in weight during the tests, but as the surface was blistered and the ends cracked on test pieces it cannot be recommended for use in mine water.

An extensive discussion of all the phenomena observed cannot be given here, but the foregoing should be of service in making selections of metals and alloys for use in mining equipment which is to be exposed to the action of acid water.

Careful examination was made of all corroded test pieces, and the nature and extent of deposits, coatings, pits, pinholes and other phenomena were noted and are discussed in Bulletin 4.[5] Microscopic examination was

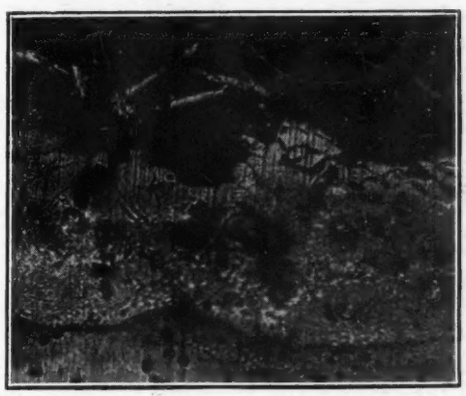


FIG. 5—COATING ON HARD-ROLLED PHOSPHOR BRONZE

Alloy consists of copper, 89.8 per cent; tin, 5.6 per cent; lead, 4.6 per cent; iron, a trace; phosphorus, 0.5 per cent, maximum. Surface is etched with acidic $FeCl_3$. Magnification 200 diameters.

[5]Work cited.

TABLE II—DESIGNATION, COMPOSITION AND LOSS-IN-WEIGHT NUMBER OF SPECIMENS CORRODED IN MINE WATER FROM EDNA NO. 2

Designation	Chemical Composition, Per Cent	Loss-in-Weight Number
Brasses		
Rolled high brass	Cu, 66.55; Zn, 33.45(a)	7
Rolled low brass	Cu, 80.09; Zn, 19.91(a)	7
Rolled naval brass	Cu, 60.40; Sn, 0.77; Zn, 38.83a	7
Rolled brass (Admiralty metal) grain size, 0.025 mm	Cu, 70.80; Sn, 1.14; Zn, 28.06	7
Rolled brass (Admiralty metal) grain size, 0.035 mm	Cu, 71.38; Zn, 27.36; Sn, 1.26	6
Rolled brass (Admiralty metal) grain size, 0.075 mm	Cu, 71.46; Zn, 27.42; Sn, 1.12	6
Rolled brass	Cu, 57.95; Pb, trace; Sn, 0.47; Fe, 0.55; Zn, 41.02	7
Manganese Brasses		
Cast manganese brass	Cu, 68.05; Zn, 27.89; Fe, 1.55; Pb, 0.45; Mn, 2.06	3
Cast manganese brass	Cu, 67.45; Zn, 28.84; Fe, 1.48; Pb, 0.28; Mn, 1.95	4
Rolled manganese brass	Cu, 67.10; Zn, 29.64; Fe, 0.97; Pb, 0.30; Mn, 1.99	4
Rolled manganese brass	Cu, 65.5; Pb, 0.5; Zn, 30.5; Mn, 2.2; Fe, 1.3	4
Bronzes		
Cast bronze	Cu, 89.8; Sn, 9.7; Pb, 0.5	2
Rolled bronze	Cu, 98.51; Sn, 1.49	7
Rolled phosphor bronze	Cu, 94.4; Sn, 5.5; P, 0.1	5
Rolled leaded phosphor bronze	Cu, 89.8; Sn, 5.6; Pb, 4.6; Fe, trace; P, trace	2
Cast leaded zinc bronze	Cu, 86.34; Pb, 0.83; Sn, 11.24; Zn, 1.60	1
Cast leaded bronze	Cu, 74.9; Pb, 14.3; Sn, 10.5	1
Cast leaded bronze	Cu, 87.5; Sn, 10.6; Pb, 1.6	3
Cupro-nickels		
Rolled cupro-nickel (coin metal)	Cu, 74.60; Ni, 25.40	7
Rolled cupro-nickel	Cu, 84.36; Ni, 15.64	7
Cast leaded cupro-nickel	Cu, 53.57; Ni, 25.30; Fe, 0.61; Pb, 19.58; Sn, 0.56	4
Cast chromium-iron cupro-nickel	Cu, 42.24; Cr, 11.89; Ni, 35.00; Si, 1.50; Fe, 9.35	7
Cast iron-manganese cupro-nickel	Cu, 71.16; Fe, 7.47; Ni, 19.01; Mn, 2.35	7
Nickel Silvers		
Rolled nickel-silver	Cu, 63.78; Zn, 17.68; Ni, 18.54(a)	7
Rolled iron-nickel-silver	Cu, 66.03; Zn, 23.99; Ni, 9.92; Fe, 0.05	7
Rolled nickel-silver	Cu, 52.79; Zn, 34.58; Ni, 12.63	7
Cast silicon-nickel-silver	Cu, 72.3; Ni, 16.5; Sn, 3.5; Zn, 7.4; Pb, 0.3; Si, trace	7
Cast tin-lead nickel-silver	Cu, 63.52; Ni, 12.85; Sn, 4.59; Zn, 11.55; Pb, 7.49	4
Cast tin-lead nickel-silver	Cu, 54.32; Sn, 2.54; Zn, 16.33; Pb, 6.30; Ni, 20.51	4
Copper-lead Alloys		
Cast copper-lead alloy	Cu, 53.4; Pb, 46.4	4
Cast copper-lead alloy	Cu, 68.0; Pb, 31.9	5
Cast copper-lead alloy	Cu, 73.01; Pb, 26.96	5
Aluminum Alloys		
Cast aluminum-silicon alloy	Si, 3.90; Al, 96.1; (Al by difference)	2
Cast aluminum-manganese alloy	Mn, 1.81; Al, 98.19; (Al by difference)	2
Rolled aluminum-manganese alloy	Mn, 0.95; Fe, 0.95; Si, 0.53; Al, 97.57 (Al by difference)	2
Rolled aluminum alloy	Cu, 3.62; Mn, 0.46; Fe, 0.45; Si, 0.56; Al, 94.91; (Al by difference)	2
High-silicon cast irons		
High-silicon cast iron, A	Si, 14.50; C, 1.45	5
High-silicon cast iron, B	Si, 13.80; C, 0.76	0
Rustless Steel		
Rolled high chromium steel	Cr, 29.5; Mn, 0.27; Si, 0.53; C, 0.36; Fe, balance	0
Rolled alloy steel	Ni, 23.87; Cr, 12.96; Si, 3.40; C, low; Fe, balance	0
Rolled alloy steel	Ni, 29.60; Si, 3.26; Cr, 10.73; C, low; Fe, balance	0
Miscellaneous Metals		
Rolled pure ingot iron	Fe, 99.9 (a)	7
Rolled pure aluminum	Commercially pure aluminum (a)	2
Rolled pure copper	Commercially pure copper (a)	7
Rolled pure nickel	Ni, 99.+(a)	0
Miscellaneous Alloys		
Cast aluminum bronze	Cu, 93.9; Al, 6.1; (Al by difference)	5
Rolled iron-aluminum bronze	Cu, 86.23; Fe, 4.81; Al, 8.96 (Al by difference)	6
Rolled monel metal	Ni, 65.1; Cu, 30.52; Fe, 4.2	4
Cast high-lead alloy	Pb, 96.1; alkaline earth metals balance	Gained weight
Rolled copper-manganese-iron alloy	Cu, 94.81; Mn, 4.52; Fe, 0.67	7
Rolled nickel-chromium-iron alloy	Ni, 52.50; Al, 0.20; Cr, 9.29; Si, 0.19; Mn, 1.24; Fe, balance	7
Rolled nichrome	Ni, 57.44; Si, 0.55; Cr, 9.37; Mn, 1.75; Fe, balance	0

made of the entire series of metals and alloys corroded in the Edna No. 2 mine water, and the results will be published shortly.[a] In order to arrive at an intelligent understanding of corrosion processes, also of the relative value of various metals and alloys, it is necessary to consider not only the data as to loss in weight but also the condition of the test pieces after corrosion, as shown by careful visual and microscopic examination. Deep pitting, for example, may not result in much loss in weight, yet would render the material unfit for use in acid mine water.

In the course of the examinations made coatings were observed on many of the metals and alloys. These coatings may result from the decomposition of the specimen, by deposition from the water or from both causes. Many of the coatings could be easily removed, and it is not possible to say whether they accelerate or retard corrosion. Other coatings were relatively hard and impervious and could properly be designated as protective in nature. Such a coating is shown in Fig. 5.

As a result of the various investigations the following general conclusions may be drawn regarding metals and alloys for use in mine water:

(1) Ordinary industrial grades of iron and steel, brasses, cupro-nickels, nickel-silvers and aluminum and aluminum-alloys will not withstand the action of acid water from coal mines.

(2) A high-silicon cast iron, a high-chromium steel, two chromium-nickel-silicon steels and nichrome were very resistant to the action of acid mine water.

(3) Certain bronzes, copper-lead alloys, nickel and monel metal may be of value for special purposes where it is not desirable to use the materials previously mentioned.

The writer wishes to acknowledge the aid received from A. C. Fieldner, supervising chemist of the Pittsburgh Experiment Station, U. S. Bureau of Mines, and from W. A. Selvig and R. J. Anderson, also of the Pittsburgh station.

[a] Anderson, R. J., and Enos, G. M., "Microstructural Aspect of Metals and Alloys Corroded by Acid Mine Water," Bulletin 5, Carnegie Institute of Technology. Ready about May, 1923.

British Coal Exports Climb in 1922

Exports of British coal during 1922 amounted to 64,198,384 tons as compared with 24,660,552 tons the previous year and 73,400,118 tons in 1913. Comparative figures showing the exports and destinations for 1913, 1921 and 1922 follow, in tons:

	1913	1921	1922
Russia	5,998,434	138,878	584,069
Sweden	4,563,076	1,232,904	2,522,820
Norway	2,298,345	694,316	1,566,989
Denmark	3,034,240	1,803,561	2,866,233
Germany	8,952,348	817,877	8,345,606
Netherlands	2,018,401	1,787,678	6,067,789
Belgium	2,031,077	618,066	3,489,419
France	12,775,909	6,395,651	13 579,417
Portugal	1,201,722	436,365	784,356
Spain	2,534,131	1,021,472	1,711,021
Canary Islands	1,114,629	160,304	524,815
Italy	9,647,161	3,383,083	6,341,743
Greece	727,899	248,554	428,647
Algeria	1,281,664	455,364	1,032,282
French West Africa	149,107	48,730	119,327
Portuguese West Africa	233,015	107,022	193,667
Chile	588,526	22,624	84,311
Brazil	1,886,871	242,223	1,013,221
Uruguay	723,936	221,817	502,533
Argentine Republic	3,693,572	887,344	2,021,092
Channel Islands	167,862	113,964	160,636
Gibraltar	354,702	367,750	689,428
Malta	700,111	206,108	214,396
Egypt	3,162,477	1,017,748	1,743,643
British India	179,192	531,561	999,159
Ceylon	239,657	140,307	232,675
Other countries	1,749,877	1,462,453	6,168,825

THE TROUBLE SEEMS TO BE that too many people think the law should be enforced, and not enough think it should be observed.—*Portland Telegram.*

HISTORY DOUBTLESS WILL MAKE it plain that the Ruhr invasion was preceded by the Ruhr evasion.—*Boston Herald.*

Wahlen Micromanometer Accurately Measures Static And Velocity Heads in Mine Ventilation

Will Measure Differences of Pressure to Ten-Thousandth of an Inch of Water Pressure and Even Less—How to Separate Resistance Pressure from Velocity Head—Reliable Coefficients Need to Be Worked Out

By Louis W. Huber*
Urbana, Ill.

RELIABLE indications of air pressure are essential if the effect of turns, contractions, expansions and surface irregularities, such as steel and timber sets, rough ribs and roofs and standing props, in reducing the flow of air are to be measured. Economies that conceivably may be of great importance have not been made owing to the fact that up to the present we have not been able to evaluate with sufficient exactitude the savings that certain improvements in air channels would effect. The question is now being put under careful and scientific investigation, and it has been found that to make the necessary tests the introduction of new apparatus is needful. Here again it will be noted that the necessities of a line of inquiry remote from that of mining have furnished the coal-mining investigator with a valuable tool for the development of his industry.

The Wahlen gage or Illinois micromanometer is, strictly speaking, an alcohol gage for determining differential pressures. It was developed by F. G. Wahlen for the University of Illinois engineering experiment station. The need for such a gage was felt by the staff of that station for use in connection with its researches into warm-air furnaces. A manometer was needed for measuring the pressures associated with low air velocities of from 2 to 7 ft. per second or velocity heads of about 0.0015 to 0.0120 in. of water.

Exceedingly Sensitive to Pressure Changes

What was desired was a measuring device that would offer no frictional resistance to the flow of air, that would be exceedingly sensitive, readily portable and easy to operate. It was felt that a Pitot tube, used in connection with an extremely sensitive gage, would fill all requirements and allow the flow of air to be measured directly. A Chattock† gage was constructed and tested, but, although it was sensitive enough, operating difficulties prohibited its application to the work.

F. G. Wahlen was detailed to this investigation, and he developed a gage so sensitive and accurate that it would measure heads of less than 0.0001 of an inch of water and respond almost simultaneously to the slightest fluctuations in pressure.

The essential features of the Wahlen gage as shown in the illustrations (Figs. 1 and 2) are a rigid base supported by three leveling screws and leveled by means of a right-angle or "cross" spirit level, and two large glass bulbs (*A* and *B*) communicating with one another by means of an inverted U-tube, and supported by the rigid base. The left-hand bulb, *B*, is firmly and rigidly attached to the frame and is always stationary. The right-hand bulb, *A*, is fixed on a carriage which permits it to be moved vertically up and down. This motion is controlled by frictionless guides which eliminate all side motion. The bulb is raised and lowered by a micrometer screw reading to 0.001 of an inch direct, a slight swiveling action in the joints of the hinged connection of the glass tube at *E* admitting of this movement.

Alcohol saturated with kerosene of a specific gravity of 0.8195 and colored with aniline dye to a distinctive red color about half fills the two bulbs and the U-tube. The upper half of the U-tube is filled with a clear mixture of kerosene and ligroin, so apportioned that its specific gravity is about 0.0095 less than that of the alcohol. Ordinary kerosene may be used as the lighter

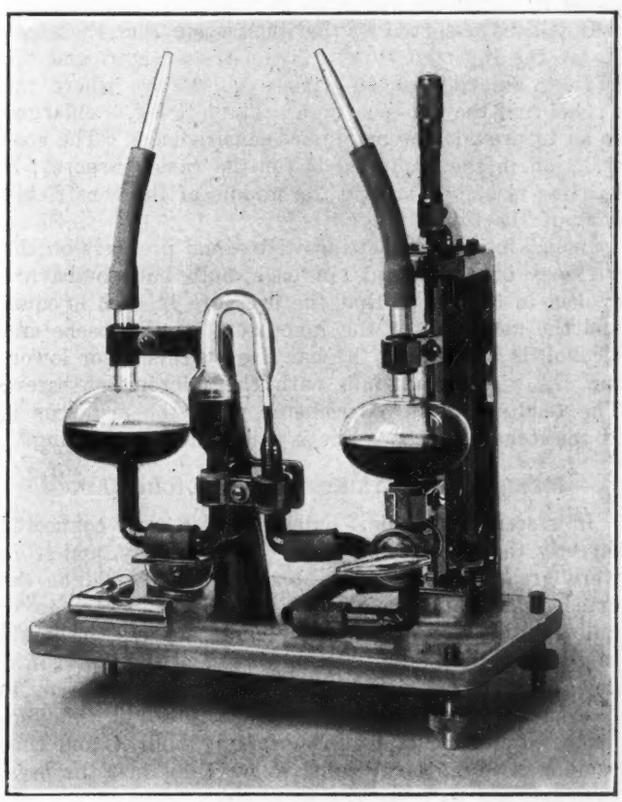


FIG. 1—WAHLEN GAGE OR ILLINOIS MICROMANOMETER

Air is received under different pressures in the two flasks, or bulbs, on either side of the instrument, and this disturbs the level of the fluid so that to keep the level constant it is necessary to raise the right flask. This is done by a micrometer screw the movement of which records that motion. The parts of the connecting tube which appear empty or filled with air contain pure kerosene or more usually a colorless mixture of kerosene and ligroin. The darker liquid in the tube and flasks is alcohol saturated with kerosene and colored with aniline dye. The junction of the two liquids, the level of which is manipulated by the raising of the right-hand flask, is brought to coincidence with an etched line in the constricted part of the tube.

*Graduate assistant in mining research, University of Illinois.

†See "Report on Wind Tunnel Experiments in Aerodynamics," by J. C. Hunsaker and others, page 12 and following pages. Published by the Smithsonian Institution, Washington, D. C., Jan. 15, 1916.

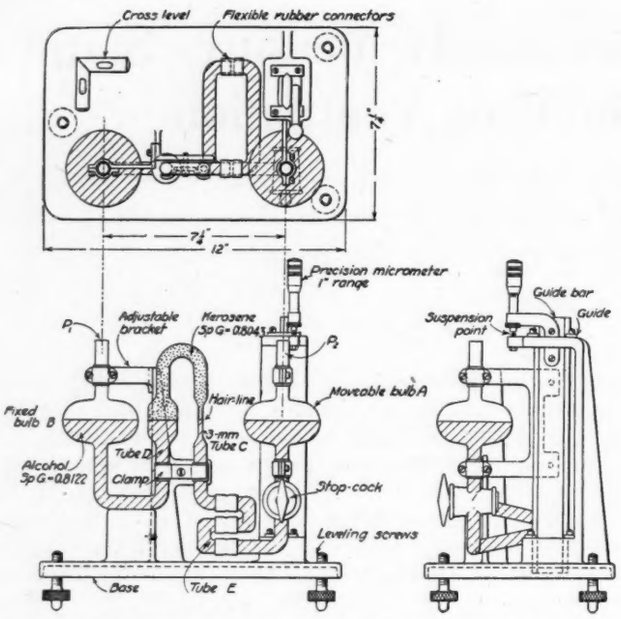


FIG. 2—DIAGRAMMATIC DRAWING OF WAHLEN GAGE

The adjustment of the instrument always is to the hairline in the 3-mm. tube *C*. Raising the right flask, or bulb, *A*, one-thousandth part of an inch moves the liquid in the 3-mm. tube ⅛ of an inch. This large multiplication of the movement of the bulb makes the adjustment of the gage quite delicate and gives a remarkably accurate measurement of the difference of pressure. The adjacent enlargement of the tube at the same level also makes it possible to adjust the instrument with remarkable accuracy.

liquid if the above difference in density is maintained.

It will be observed in the illustration that the right leg of the inverted U-tube is constricted at *C* and the left leg enlarged at *D*. These points are where the alcohol and the kerosene join. The left leg is enlarged so as to provide for maximum sensitiveness. The constriction in the right leg is for the same purpose. A hairline is etched around the middle of the constricted part of the tube.

In making a zero setting with equal pressure on the surfaces of the liquids in each bulb both bulbs are opened to the air so that the pressure in each is equal and the meniscus, or the juncture of the kerosene and alcohol, is brought to the hairline by raising or lowering the right-hand bulb with the micrometer screw. The reading of the micrometer when the meniscus is at the etched reference line is called the zero reading.

Meniscus Always Restored to Etched Line

It is seen then that if bulbs *A* and *B* were connected directly to pressures P_2 and P_1, respectively, and if P_1 were greater than P_2, greater pressure would be exerted on the surface of the liquid in bulb *B* than in bulb *A*; this pressure would tend to depress the liquid in *B*, force the liquid in *D* upward, and the liquid in *C* downward. This would tend to cause the meniscus to descend from the etched reference line, but this tendency can be neutralized by raising bulb *A* and thus causing a "head" of alcohol to work against the pressure tending to move the meniscus.

By means of the micrometer the bulb *A* is raised as high as is necessary to neutralize the pressure difference between P_2 and P_1. The exact distance that the bulb is raised is obtained from the difference between the zero, or initial, reading of the micrometer and the final reading. This means, then, that the difference between pressures P_1 and P_2 is equal to the head of alcohol obtained by raising bulb *A*. The distance the bulb is raised is measured directly to 0.001 of an inch on the micrometer and if necessary it can be measured to 0.0001 of an inch.

Knowing the head in inches of alcohol and knowing the temperature of the alcohol, which is, of course, the temperature of the surrounding air, the specific gravity of the alcohol can be found from a temperature-specific gravity curve and the head or pressure in inches of alcohol can be changed to inches of water, pounds per square foot, pounds per square inch, or whatever is desired. The specific gravity of alcohol varies with the temperature, so a specific gravity-temperature calibration curve is made of the alcohol in the gage each time it is filled. (Fig. 3.) A final zero reading always is taken after using the gage, and the initial zero reading and final zero reading should check within at least 0.001 of an inch.

Before filling, the glassware and rubber tubing of the gage must be chemically clean so that the liquids and particularly the meniscus or juncture of the alcohol and kerosene will rise and fall easily and cleanly. The red, or alcohol, liquid is put in the gage first so that it completely fills the inverted U-tube *C*, all the connections, and about one-third of the bulbs.

Care Used in Filling Micromanometer

A small measuring pipette with a stopcock to govern the flow and a small rubber tubing attached to the end is filled with kerosene. The kerosene is allowed to fill the rubber tubing completely so as to insure the absence of air bubbles, and the tubing is inserted down through bulb *B*, around the bend below *B*, and up through leg *D* of the inverted U-tube. The stopcock below bulb *A* is left open so as to permit equal displacement in bulbs *A* and *B*, and the kerosene, or colorless liquid, is allowed to ascend into the inverted U-tube and displace the alcohol. Enough kerosene is admitted (controlled by the stopcock in the glass pipette) to displace the alcohol and bring the two juncture points of the liquid within the constricted tube *C* and the enlarged tube *D*.

The specific gravity of the alcohol is obtained at several different temperatures by means of a Westphal specific-gravity balance, and a calibration curve, con-

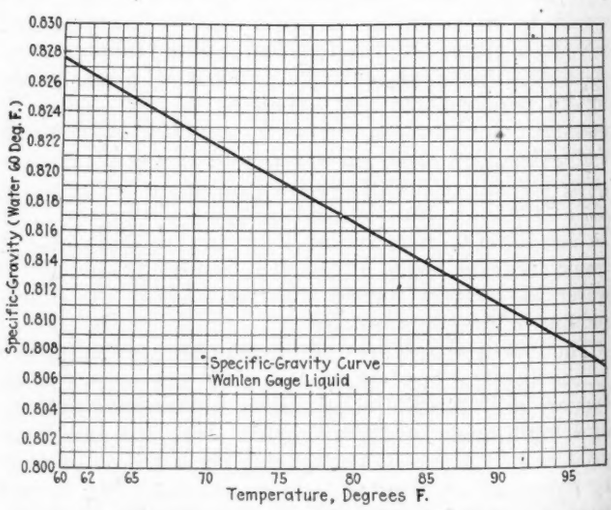


FIG. 3—GRAPH RELATING DENSITY TO TEMPERATURE

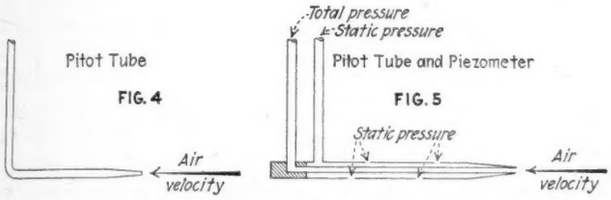
It has been determined that 0.8195 is a good working specific gravity for the mixture of alcohol and kerosene, but whatever it is its specific gravity must be known for every temperature likely to be encountered. This graph, starting at 60 deg. and ending at 100 deg., is adequate for intake temperatures, though only in places for those in the real workings.

necting specific gravity with temperature, Fig. 3, is drawn for the range in temperature under which the gage is likely to be operated.

A thousandth of an inch movement of the micrometer screw moves the meniscus about a sixteenth of an inch. This movement of the meniscus, however, can be adjusted to be greater or less by adjusting the difference in the specific gravities of the two liquids to be greater or less than 0.0085. This density, however, has been found to be about the "happy medium" for ordinary work.

In operating the gage after the bulbs are connected to the differential pressures P_1 and P_2, the stopcock below A is opened slightly until the direction of the movement of the meniscus is observed; it is then closed and bulb A raised or lowered to neutralize the pressure tending to move the meniscus; this is repeated until the pressures are balanced and the meniscus is stationary and at the etched reference line. In this way, by careful and delicate manipulation, the meniscus is never permitted to move out of the constricted part of the tube C.

It is evident then that, as there is no movement of



FIGS. 4 AND 5—PITOT TUBES AND PIEZOMETER

The pitot tube is affected by both velocity and static head, but with the piezometer attachment and the Wahlen gage the total head can be partly balanced by the static head and the difference will be the velocity head. The static head is obtained by openings the edges of which lie in the plane of the current and not at right angles to it.

the liquids, no corrections need be made for capillarity, viscosity, variations in the bore of the tubes, or conditions of the glass surfaces. The sensitiveness of the gage depends upon the relation between the areas of the cross-section of the large bulbs and the cross-section of the constricted tube, the viscosity characteristics of the two liquids, the small difference in specific gravity, and upon the fact that the constricted part of the U-tube is short. Other connections are large and free. The micrometer used is a standard machinists' micrometer with three-quarters of an inch to an inch measuring range.

The gage was developed primarily for measuring low air velocities with a Pitot tube, and it can well be used for this down in the mine, for no matter how carefully and accurately an anemometer traverse be made of a mine entry the results are not trustworthy as there are friction losses (especially if an anemometer cannot be rested on a firm base), mechanical defects in the anemometer, and quick changing puffs of air in the main flow due to innumerable projections and constantly changing eddy currents.

An anemometer cannot be calibrated so as to correct these defects and irregularities. When velocity readings are made with a sensitive gage and Pitot tube the readings are reliable, for by this system velocity pressure, and hence velocity, is measured direct, and the only requirements are that the Pitot tube be held out firmly so as to be stationary and meet the air flow squarely.

However, a plain Pitot tube such as is shown in Fig. 4 would measure not only velocity pressure but the static pressure as well. Air flowing in restricted passageways such as air duct, galvanized pipe or airways down in the mine is under three distinct pressures: the velocity pressure, static pressure, and dynamic pressure. The velocity pressure is that pressure necessary to change a quantity of air from a state of rest to a state of motion. It is, then, the pressure or head necessary to accelerate a mass of air from a state of rest to the final velocity attained.

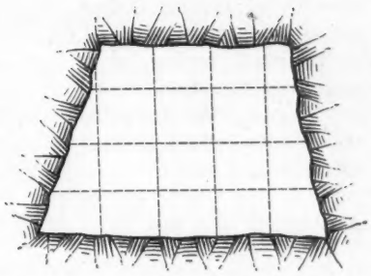


FIG. 6—MANNER OF DIVIDING AREA FOR PRESSURE SURVEY

Measurement of the pressure can be taken at the center of each square or at the intersections of the lines shown. In this way an average result for the airway may be obtained.

The static pressure, or head—also termed the frictional, or resistance, pressure, or maintained resistance—is the pressure necessary to overcome the resistance offered to flow. It is in reality the pressure exerted against the sides of the airway that the air is flowing in and is measured as such with the ordinary pressure gage. The dynamic or total pressure—also termed the impact pressure—is the sum of the pressures required to overcome resistance to flow and create the velocity of discharge. It is equal to the sum of the static and velocity pressures.

Modifying Pitot Tube to Get Static Head

Obviously then the pressure recorded by the Pitot tube in Fig. 4 would be the total pressure. We desire to measure velocity pressure, and can do so because velocity pressure equals total pressure minus static pressure. By measuring the difference between total pressure and static pressure we can measure velocity pressure alone. This is accomplished by attaching the two separate bulbs of our differential gage to the total pressure and to the static pressure and measuring the differential pressure, which is the velocity pressure or head. This is accomplished by means of a Pitot tube as shown in Fig. 5.

The piezometer and Pitot tube are combined in one tube in the above illustration. This is the standard tube which the American Blower Co. uses for fan testing. Static pressures are exerted through the small holes in the side of the outer tube whereas both velocity and static pressures are exerted through the center or Pitot tube. These tubes are completely separated from each other so that different pressures are exerted in each one, and the difference between them is measured.

By means of such a tube and a Wahlen gage a careful and accurate traverse of a mine entry can be made in a comparatively short time and the different velocity pressures or heads accurately determined. The best sort of a traverse is made by dividing the entry area into a number of squares (Fig. 6) and taking a reading either in the center of each square or at the cross points of the division lines and averaging the resulting heads.

The formula for getting velocity in feet from head in inches of water is derived from the formula for the

velocity of falling bodies, $v^2 = 2gh_x$. When g is the acceleration of gravity in feet per second per second, h_x is the head, or height in feet, of the flowing medium and v is the velocity of the flowing medium in feet per second. We cannot measure the head or height of air column inducing flow directly in feet of air, so we measure and express it in inches of water.

If h_x = head, or height in feet of the flowing medium, or air, and h_v = head in inches of water:

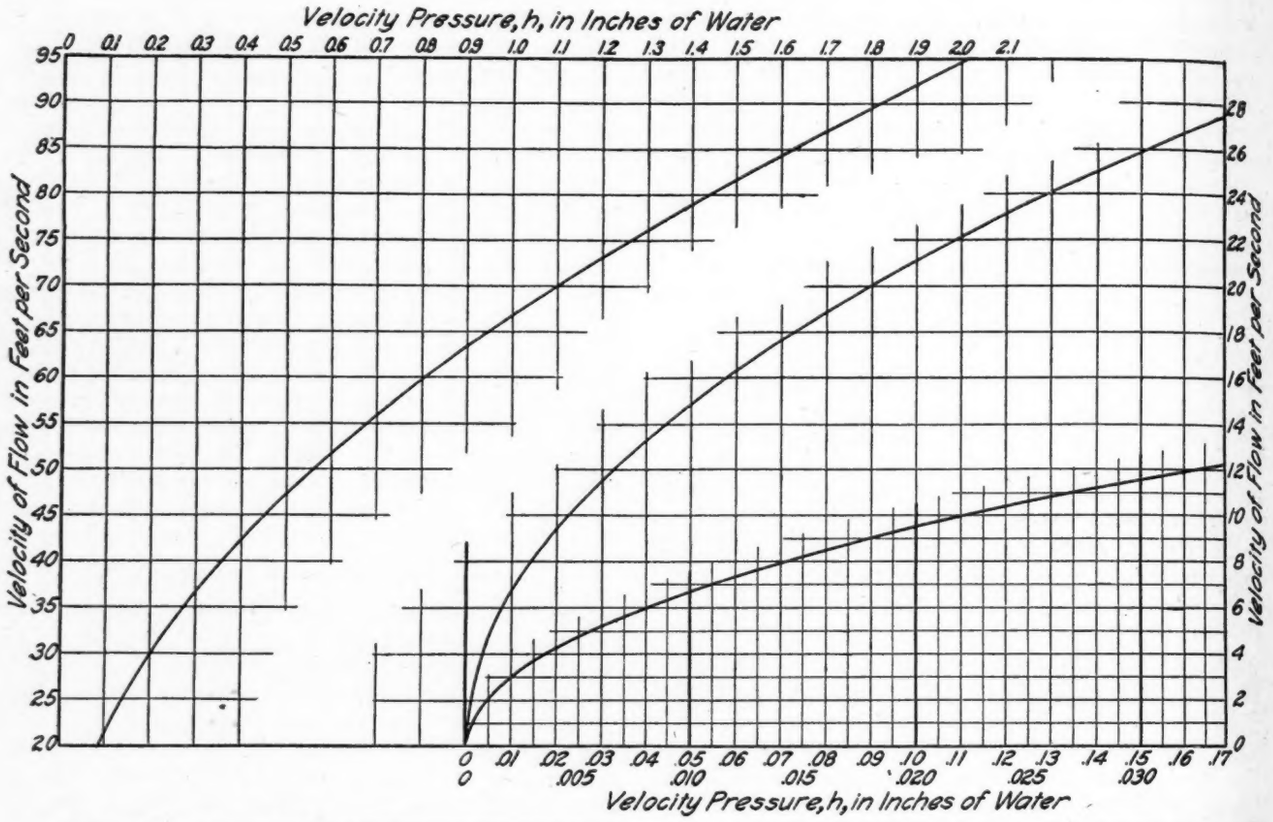
$h_x d = \frac{h_v k}{12}$, where d = density of air, lb. per cu.ft. and k = density of water, lb. per cu.ft.; 62.4 lb. at 70 deg. F. Then, $12\,dh_x = h_v k$

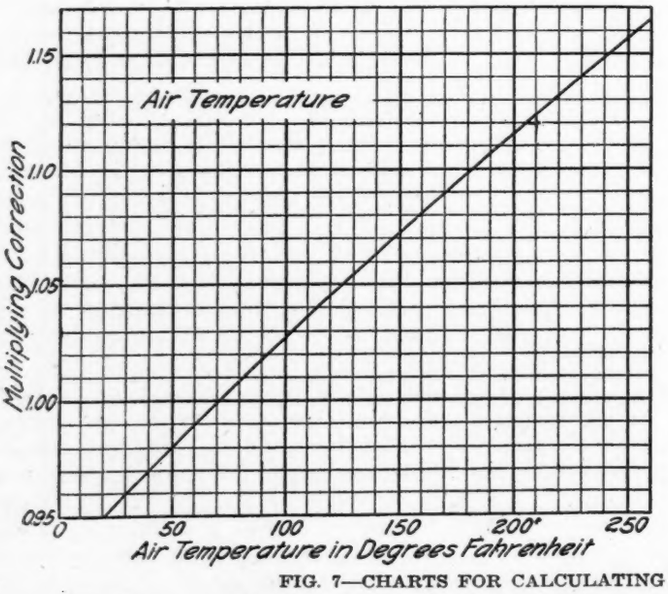
$$h_x = \frac{h_v k}{12\,d} = \frac{v^2}{2g}$$

$$v^2 = \frac{2gh_v k}{12\,d}\,;\; v = \sqrt{\frac{2gh_v k}{12\,d}}.$$

v in ft. per sec. $= 18.27\sqrt{\frac{h_v}{d}}$

h_v is measured directly in inches of water and d can


Velocity Pressure, h, in Inches of Water
Velocity of Flow in Feet per Second
Velocity of Flow in Feet per Second
Velocity Pressure, h, in Inches of Water



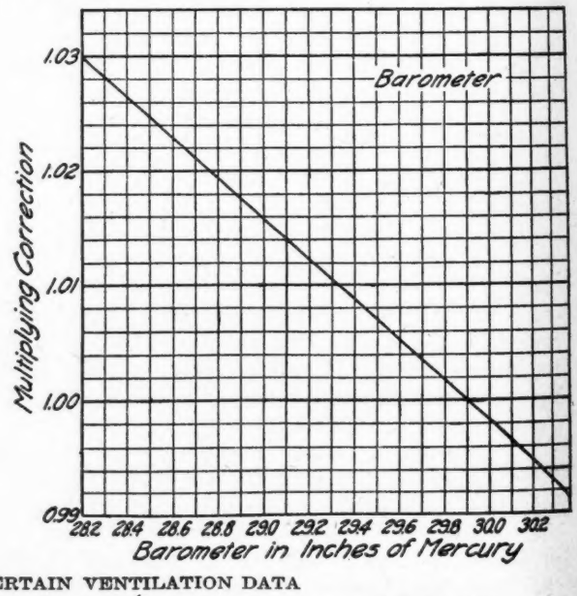


FIG. 7—CHARTS FOR CALCULATING CERTAIN VENTILATION DATA

The upper curves give velocities corresponding to velocity heads in inches of water, but these have to be corrected both for air temperatures and barometer readings. The gage-water density correction is negligible. $v = gkh/6d$ when $g = 32.17$; h = velocity pressure in inches of water; k = water density at 70 deg. F. = 62.4 lb. per cubic foot; d = air density at 70 deg. F. and 29.92 in. of mercury = 0.0749 lb. per cubic foot.

be calculated for any temperature and barometric pressure by means of the formula

$$d = \frac{1.325\,B}{T}.$$

B = barometric pressure in inches of mercury.
T = absolute temperature in degrees Fahrenheit.

This latter equation is derived from our formula for a perfect gas, namely $PV = MRT$. Air acts as such a gas and obeys this law within normal conditions of temperature and pressure.

P = absolute pressure in pounds per square foot.
V = volume in cubic feet.
M = weight of air in pounds = 1.
T = absolute temperature in degrees Fahrenheit.
R = 53.37, the constant for air.

$$PV = MRT \quad d = \frac{1}{V} = \frac{M}{V} = \frac{P}{RT}$$

$$d = \frac{144 \times 0.491 \times B}{53.37 \times T}$$

$$= \frac{1.325\,B}{T}$$

Much calculation, necessary to convert from inches of water to feet per second, can be avoided by means of the curves shown in Fig. 7. The results obtained from these graphs are accurate enough for all practical purposes.

The Wahlen gage is a precise and valuable instrument for measuring air velocities, but it has further values of some consequence in mine ventilation. The coefficient of friction for shaft lining and for sections of entry can be easily and quickly determined by means of the Wahlen gage and the static-pressure boxes developed at the University of Illinois mining engineering experiment station.

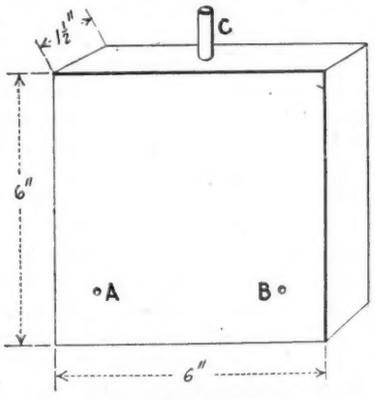


FIG. 8—STATIC-PRESSURE BOX

With the 1½-in. side of this empty airtight box facing the ventilating current the air has no easy task to find the minute holes A and B, and consequently the air in the box is subject to none of the pressure that is due to the velocity of the air in the passageway. The static pressure of the airway is all that affects the pressure in the box. That pressure is communicated through pipe C and thereby to one of the bulbs in the Wahlen gage.

These static-pressure boxes (Fig. 8) are empty galvanized-iron boxes, 1½x6x6 in., completely airtight, except for two No. 60 drillholes in each of the two broad sides and a hole in the top. Around this hole in the top a short piece of brass tube ¼ in. in diameter is soldered. When the box is set down in the mine entry with its narrow side facing toward the wind, only static pressure is transmitted through the small No. 60 drillholes in the sides, thence through the brass tubing acting as a nipple on the top, and thence through rubber or other flexible tubing to the gage, where it is measured. The distance through which the pressures are transmitted is immaterial, providing the pipe or tube through which they are transmitted is airtight and providing enough time is allowed for the pressure to become constant through the entire pipe or tube.

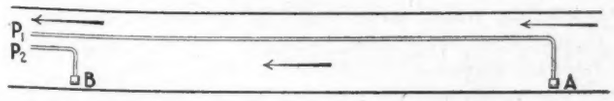


FIG. 9—METHOD OF USING BOX TO DETERMINE CHANGE OF STATIC PRESSURE IN ENTRY

The pressure P_1 from box A is taken to one bulb of the Wahlen gage and the pressure P_2 from box B is taken to another. The difference in pressure determines the loss of head resulting from the resistance of the airway.

In Fig. 9 the pressure boxes at A and B record the static pressures, P_1 and P_2, that exist at those points. These pressures can be transmitted through the tubing to a convenient spot where the Wahlen gage is located, and the difference between them measured. The difference between P_1 and P_2 represents the static pressure loss or the pressure necessary to force the quantity of air flowing (this quantity must also be measured) from point A to B. This is the pressure necessary to overcome the resistance offered to this quantity of air and is the part of the total water gage for which this section of entry A to B is responsible.

With two static pressure boxes, enough tubing, and a Wahlen gage an observer can go throughout the air courses of a mine and find the main causes of loss of pressure, and hence the power losses. The resistances offered by and the pressure lost in overcoming the resistance of each obstruction, bend, section of irregular and jagged entry, section of heavily timbered entry, approach and retreat to and from overcasts, sharp turn, and sump occurring in the air courses can be segregated and the mine resistance thoroughly investigated.

Are Bends and Obstructions Bad as Stated?

If the exact pressure and power loss caused by some obstruction or irregularity in the ventilating system is known, it is easy to calculate whether or not it would pay to remedy the obstruction. At present the mining engineering experiment station of the University of Illinois, College of Engineering, is investigating the power losses caused by sharp bends and sumps at the bottoms of airshafts.

In a paper read before the West Virginia Coal Mining Institute at its summer meeting in 1910, Thomas W. Fitch, Jr., stated that: "The resistance offered by turns can be disregarded for low velocities, but where the velocities are high, the loss of pressure becomes serious. Where air is forced around a right-angled turn, with the corners square, the pressure loss usually is assumed to be double the velocity head. For example, if air is traveling in an airway at a velocity of 1,000 ft. per minute, its velocity head is 0.06 in. water gage, and the loss due to a right-angle turn would be 0.12. Where a curve is used this will be greatly reduced."

Mr. Fitch's conclusions were not based on actual experiment in the mine but rather on similar experiments with piping systems. With the Wahlen gage and static-pressure boxes sufficient data can be collected showing at different velocities the resistance of all sorts of turns, expansions and contractions which Mr. Fitch asserts are serious sources of pressure losses when the velocity is high. From these a reference curve or table can be constructed.

By referring to such a curve or table for bends and irregularities and using a dependable coefficient of friction for stretches of entry, the mine resistance and

operating water gage could be estimated much more closely than it is now by means of the coefficient of friction alone.

The coefficient of friction to which reference most frequently is made is that advanced by Atkinson and is 0.0000000217. This is the resistance, in pounds, offered by 1 sq.ft. of rubbing surface to air flowing at the rate of 1 ft. per minute. This coefficient will suffice for rough, crooked, irregular and timbered air passageways, but is much too high for average airways. Much work must yet be done before good standard and reliable coefficients for different conditions are established, for from Atkinson's time to the present the general coefficient for average airways has been given values of from 0.000000001872 to 0.0000000219.

Operators and superintendents are coming to realize more and more that power losses in the ventilation system are much more serious than they seem to be, because the ventilating fan and system is in operation 24 hours a day seven days a week. If we consider a small mine producing 1,000 tons of coal per day as requiring 50,000 cu.ft. of air per minute; in a week the mine will produce 6,000 tons of coal, but the fan, working continuously and blowing air at the rate of 50,000 cu.ft. per minute through the mine, will have handled

$$\frac{50{,}000 \times 0.075 \times 60 \times 24 \times 7}{2{,}000}$$ or 18,900 tons of air.

This means that for every ton of coal that was hoisted 3.15 tons of air was forced through the mine.

The Wahlen gage is not as yet a practical gage for everyday use, because it is delicate and heavy and must be manipulated carefully in order that trustworthy results can be obtained. It is an extremely valuable instrument in the hands of one who has become accustomed to its manipulation while making accurate ventilation determinations or while making researches into the flow of air and ventilation.

To Discuss Equipment Problems in Forum At Mining Congress Convention

THE national expositions of mines and mine equipment have become a permanent and important feature of the annual conventions of the American Mining Congress, which are the recognized meeting place for mining men from all parts of the United States. At the two previous expositions the attendance was made up largely of mine executives and high operating officials. The attendance of these men have been of great value but naturally the exposition, with its comprehensive display of every type of mechanical equipment entering into mine production, is of special interest to the operating men, who have daily problems to solve in connection with the handling of particular phases of mechanical equipment.

As a matter of fact the objective of these expositions has been and is primarily to furnish the mine operator with an opportunity of studying and comparing all of the different types of equipment in order that through such comparison he may be able to solve his equipment problems and to obtain the exact type of equipment particularly adapted to the working conditions in his mine.

The value of this opportunity can hardly be overestimated, says E. C. Porter, convention manager, but the greatest benefits will never be obtained until the mine owner and mine executive makes it a point to see that the different operating men in his mines dealing with electrical equipment, transportation problems, the handling of explosives, etc., are sent once a year to these expositions at company's expense to study and report and thereby be in a position to use the knowledge thus gained as a basis of saving money and of lowering costs through intelligent purchase of the right type of mining machinery and mine equipment.

In order to give operating men an opportunity of discussing in an informal and practical way the day-by-day equipment problems which are met in mining enterprises, the convention and exposition management has arranged this year as a special feature of the Milwaukee meeting, Sept. 24-29, a series of group conferences between the representatives of the exhibitors and the operating men which has been designated the "Open Forum."

Will Educate Coal-Mine Operatives

PENNSYLVANIA STATE COLLEGE, through its president, Dr. John H. Thomas, has outlined a plan for helping ambitious young men who are engaged in mining to learn more of the technical as well as the practical side of the work.

State College already has a course in mining engineering but Dr. Thomas plans a short course in practical mining where young men may receive instruction either personally or by mail. The course is designed to teach how to operate pumps, fans, mine cutters, fan systems, electrical apparatus and other machinery with which mines are now equipped. This is not the work of the mining engineer, but the work incident thereto pays well nevertheless and operators and mining companies are finding it increasingly difficult to get competent men to fill these positions.

Heretofore operators could get skilled men for such jobs only by training them at the mines. Men with the proper training and ability are paid from $200 to $400 per month, and the jobs are well worth while to the young men who equip themselves for that purpose. This work has been conducted in a haphazard manner in the past and it is the opinion of Dr. Thomas that a school such as is planned can do much to bring about better results, especially in the central Pennsylvania bituminous field.

State College is situated near a field that mines one-twelfth of all the coal produced in the United States. The school will be designed distinctly for coal miners. No technical or educational attainments will be required for entrance into the school save a reasonable, natural aptitude and the ability to read and write. Thus there will be no barriers to keep out ambitious young men.

Dr. Thomas is of the opinion that such a course would tend to keep young men in the business and increase their earnings. In connection with the course, camps of instruction would be established at central locations, near a well-equipped mine, where practical instruction could be given.

MINERS APPEAR CONFIDENT, for some reason, that the Government could run the coal mines better than it ran the railroads.—*Washington Star.*

WHAT WE NEED just now is not the output of the best minds so much as the output of the best mines.—*New York Tribune.*

Tank for Cleaning, Classifying and Thickening, in One Operation, Fine Anthracite or Bituminous Coal

Water Near Top of Tank Drawn Off by Centrifugal Pump and Fed in Slowly Revolving Jets to Bottom Stratum, Where It Loosens Mixture, Permitting Coal to Float to Base of Clear Zone

By John F. Hardecker
Brooklawn, N. J.

TO THE coal industry, breaker, or washery, slush is at present an ever-growing nuisance. In fact in most cases it represents an actual monetary loss to the operator. It is essential that this, as indeed every other waste, should be eliminated. Breaker water in itself is in many instances a source of no inconsiderable expense. To recover most of the coal in the slush and clarify the water so that it may be used again and to do both of these things economically and practically would be an advantage to everybody. If this could be done the apparatus would not only save coal but render the water from the breaker available for re-use. Such a device, therefore, would be to the operator a source of additional output and profit.

Before examining the method to be advocated it might be well to review the means by which efforts are being made in some few places to eliminate this waste. These involve the use of three machines. A classifier is used to remove from the breaker slush all coarse granular matter, but that, unfortunately, includes all the impurities. An effluent much diluted, but carrying nevertheless much coal and impurity, is discharged from the classifier. This discharge is then treated in a thickener, which thickens it to about 50 per cent moisture. Even this is not a perfect action, as much fine coal escapes with the water that leaves the thickener. The product of the classifier contains such a large quantity of impurities that it is necessary to treat it in a concentrator, which at best leaves from 8 to 12 per cent of impurities in the final product.

Cleans, Sizes and Thickens Product

The machine to be described does the work of all three machines, acting at once as a thickener, classifier and concentrator. Furthermore, it will catch all of the extremely fine and all the coarse coal, separate the impurities, and leave the coal product in a thickened state ready for distribution.

The machine is illustrated by a sectional view in Fig. 1, an exterior view being shown in Fig. 2. It is intended for washing and purifying the finer grades of coal direct from the crusher or breaker, separating them in particles of a size suitable for the grade they are to occupy, and collecting and thickening the extreme fines, which are ordinarily washed to waste. The entire operation is performed in one passage through the machine and is applicable to both bituminous coal and anthracite. The machines can be made of any size and for any capacity. They have been made to deliver 500 tons per day but can be designed to have even greater output.

The machine is so constructed that when filled with a dilute mixture of solids circulation is caused by withdrawing liquid from above through an annular suction conduit, *A* (see Fig. 1), and projecting it toward the bottom from rotating jet nozzles, *B*. These nozzles rotate automatically about a cylindrical base, *C*, being suspended from above by a cylindrical shaft, *D*.

The arms from which the jet nozzles project, *E*, are immersed in the liquid, and due to their relatively slow velocity, scarcely disturb the liquid through which they are passing. The overflow launder takes out all excess water that accumulates in the system as a result of the continuous introduction of slush-laden water. The circulating pump, *F*, has a bypass above it for regulating the volume of circulation and controlling the strength of the current issuing from the rotating nozzles. To aid in the work of classification the tank is constructed with sloping sides. It also has a V-bottom for the better accumulation of the impurities.

The circulating pump withdraws thin liquid from the suction level and forces water through the rotating arms. This water escapes as jets from the revolving nozzles and sweeps through the solids to the bottom of the track. These streams, impinging on the bottom, cause a continuous return movement of water to the suction inlet. This upward flow in the tank extends only to the suction level, *G*, below which all the solids fall and are confined. The space above, termed the "clear zone," is a quiescent settling basin, undisturbed by any action from below.

The jet streams merely loosen the submerged strata and allow the impurities to settle back into place, the coal floating upward. It is a well-known fact that when sand or fragments of impurities heavier than coal are kept in close liquid suspension they will cause the coal, which is of lower specific gravity, to float to the

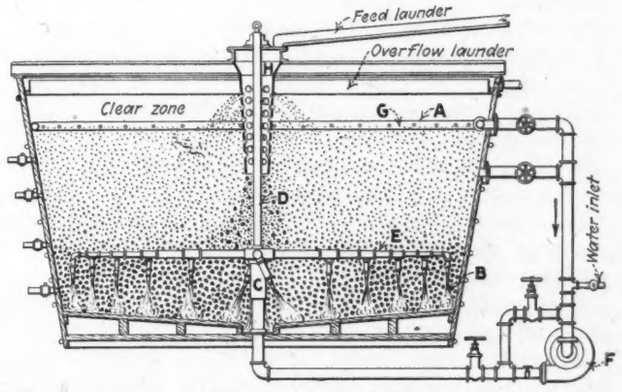


FIG. 1—SECTIONAL VIEW OF TANK THAT WILL CLEAN, SIZE AND PARTLY DEWATER COAL

By this tank the water is so freed from coal and impurities that it can be used over and over again in the washing process. The finer coal rises to the bottom of the clear zone and when removed is in a fairly thick condition. Middling coal may be discharged separately and still further reduced in size by crushing, after which it can be returned to the tank for further purification. The slate, sand or clay particles and the pyrite can be removed by a pipe near the bottom. An overflow launder is used for the discharge of clear water. Concentration and classification take place also as the tank is being fed with slush.

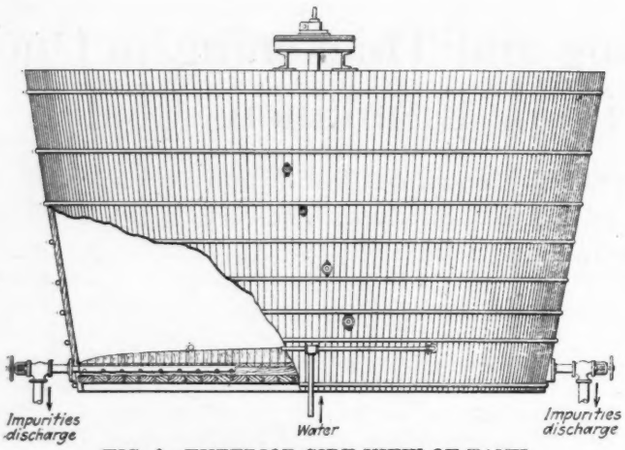


FIG. 2—EXTERIOR SIDE VIEW OF TANK

Note the flaring sides which with the growing decrease in the crowding of particles make the velocity of the water and coal on rising continuously decrease so that both finally come almost to rest, permitting sedimentation of even the purest and smallest of particles and the formation of a zone of clear water near the surface of the fluid in the tank. The impurities are drawn out at the bottom.

surface of the denser medium. To this extent the machine becomes a classifying thickener, which gathers the inflowing solids and stratifies them according to size and quality.

When the solids in the form of finely crushed coal (more or less impure) are introduced into the distributor, *H*, either in the dry or dilute condition, the coarser and heavier particles fall directly to the bottom of the tank, where they accumulate and augment the thickened strata. The lighter particles of coal spread above the impurities. When sufficient solids have accumulated in the tank the jets passing among them cause pulsations, which allow the coal to rise and form a separate stratum above the impurities, permitting the heavier particles, consisting of sand, slate, bone or other ash-forming material, to form a bed on the bottom of the tank.

Jets Loosen Impurities in Bottom of Tank

As the coarse solids thus accumulate the jets loosen the impurities so that any coal particles imprisoned by them are released and thus can pass upward in the liquid. The bed of impurities usually is allowed to accumulate to a considerable depth, as it will be more completely impure at the bottom, from which point it is discharged either continuously or intermittently.

As the bed of impurities is increased in depth it will contain a higher percentage of coal toward the top, and as the column ascends it will merge into clear coal. Therefore the mergence may be automatically controlled by regulating the discharge of impurities. (See Fig. 2.) This will be especially desirable where the coarse particles discharged are reground so that further impurities may be released.

The coal, forming a suspended stratum or column above the impurities, automatically stratifies with its heavier particles below, graduating upward to the finest. The greatest upward velocity of the liquid is between the coarser particles, through which it first passes. As the liquid rises, the tank widens and there is less obstruction from solids, and so the velocity of the liquid decreases. The upward current gradually subsides to minimum velocity and holds only the finest of the coal in suspension. Some of the extreme fines may flow with the circulation through the pump, but, due to the velocity in the tank, they must always return upward into the current when released into the tank by the jets.

When a charge has accumulated, the content of the different strata may be continually discharged from one or more outlets, the hydrostatic pressure being sufficient effectively to force coarse material from the lower outlets, the finer sizes being easily extracted from outlets higher up. To conserve water it is essential to keep the coal strata at maximum density before discharging. Under ordinary conditions, if the coal is fed into the machine with excess dilution, all excess water will escape at the overflow in a clear state.

The apparatus contains no gears or complex mechanism of any kind. It is a rugged, simple, completely balanced machine and is almost foolproof. The circulating medium has a balanced head. There are no torsional stresses or unbalanced resistances, and there is little greater stress on the mechanism when operating at full capacity than when at absolute rest. This is due to the fact that all moving parts are balanced in liquid suspension.

The machines can be modified so as to be purely classifiers for extremely fine coal or they can be used as classifiers for fine grinding machines or they can be employed for separating fine coal into merchantable sizes. As thickeners for gathering and thickening fine coal from water they have great capacity and will produce an extremely dense discharge.

When operating in connection with a fine grinding machine for eliminating impurities and producing fine coal for special purposes, water admitted through the water inlet at the right (see Fig. 1) will assist in regulating the discharge to extreme fineness.

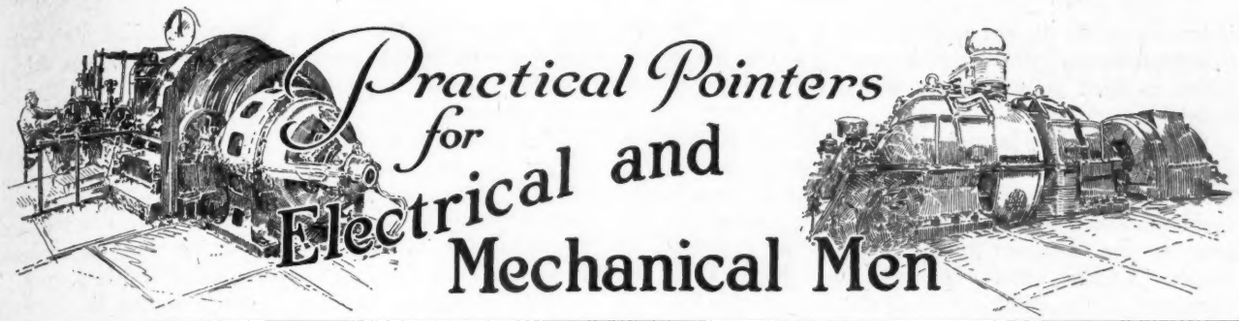
Elements of Mining

FULL credit should be given to George J. Young for his book entitled "Elements of Mining." The material in it is well selected and carefully grouped. It follows a well-conceived plan and evidently represents many years of methodical correlation.

Unfortunately for the coal-mining man, the author does not have the coal problem definitely in view. It seems even to appear as an aside or after-thought, even as any unwelcome, unbidden guest. As a result the book is better suited to the metal-mining man than to those whose duties are connected with the extraction of coal. Yet it must be confessed that this is in fact a merit in the book rather than a defect. Many readers would testify that a book with a predominance of metal-mining was just exactly what they wanted.

The treatise also keeps closely to a certain class of information and does not attempt in its 671 pages, measuring 5¾ x 9 in., to cover the multifarious side issues of the mining problem, the mechanical and electrical equipment or the subject of preparation.

The duties of mining, mechanical and electrical engineers at mines tend to overlap and the information needed by each is difficult to define with exactitude. This book, however, is written for the first of the three and especially for the man who is engaged in metal mining. To coal-mine engineers it may be said, however, that no technician safely can afford to shut his eyes to the developments of sister sciences, so readily may the achievements and concepts of one be transferred to the other. The book is published by the McGraw-Hill Book Co., 370 Seventh Ave., New York City.



Practical Pointers for Electrical and Mechanical Men

An Important Point with Reference to the Polarity of the D.-C. Generator

Where there is danger of lightning which connection and polarity should be used?—Can the circuit breaker be located to relieve short-circuits in the generator?

I HAVE heard it mentioned that there are some installations of generating equipment at coal mines where the series field winding is operated as the positive of the generator feeding direct current to the haulage and general direct-current system.

Sometimes one of our generators builds up with the wrong polarity but we are always careful to change it so that the armature lead is positive.

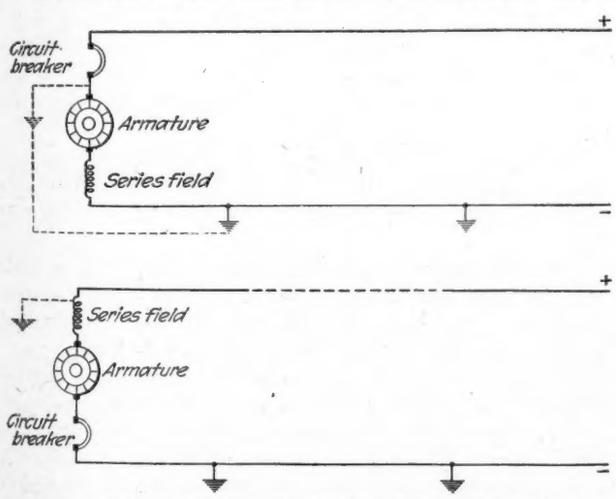
If there are any particular advantages in operating the machines with the series-field lead positive I would like to know.

A READER.

Here is a page or two of what you have been looking for. Not that it is new in "Coal Age" but it is brought together particularly for your convenience. Send in your ideas, experiences and questions. These pages of Practical Pointers are for you.

One of the greatest advantages and arguments in favor of making the series field end of a generator positive is attained where the feeder line or trolley line is run on the surface of the earth some little distance before entering the mine. Here the trolley line or feeder on the surface is exposed to lightning.

Looking at Fig. 1, where the armature lead is positive and the circuit breaker is in the positive line, a stroke of lightning near the lines in the case of the negative line would run off to ground because it is grounded, but in the case of the positive it probably would seek a path to ground through the machine; if lightning struck the armature it probably would break down the insulation there. The armature winding is difficult to repair and, furthermore, the circuit breaker would be of no avail in breaking the short-circuit thus resulting, as shown by the dotted lines.



TWO CONNECTIONS FOR THE D.-C. GENERATOR

In the first figure it is evident that a ground between the circuit-breaker and armature is not cut off by the circuit-breaker. The second figure shows a connection which may be used to advantage where the positive line is exposed to lightning disturbances.

In Fig. 2 the series field is positive and the circuit breaker is in the negative lead. A stroke of lightning now coming in on the positive line no doubt would break down the insulation of the series field. The series field insulation usually can be more readily repaired than the armature insulation; also, since the circuit breaker is in the grounded side the short-circuit resulting from the breakdown of the series field would be immediately opened by the opening of the circuit breaker.

Frequently machines are designed so that the series field should be the grounded side and of course not heavily insulated. Under these conditions it is not always possible to make the series field positive and ground the other lead, because this puts full voltage strain on the insulation of the series field.

An Easy Method for Obtaining the Diametral Pitch of Gears

ONE of the most difficult pieces of repair equipment which the electrical or mechanical man about the mines is called upon to order is a gear or pinion. Numerous catalogs and bulletins are published and available around the mines which explain various formulas about the design of gears and gear teeth. In these bulletins the pitch circle, diametral pitch, tooth root, tooth addendum, etc., are explained in detail. All of these points are interesting, but when a new gear is to be ordered the difficulty lies in this fact: Who remembers the mass of gear formulas he thought he had learned?

The importance of having the proper pitch of the teeth in a gear or pinion needs no argument, yet the question of determining this pitch from an old gear perhaps several miles underground is a real difficulty for almost anyone.

There are two ways of measuring the tooth pitch of gears, one is called circular pitch, which generally is used to measure the pitch of cast gears, and the other

is known as the diametral pitch, which generally is used to designate the pitch of cut gears. It is this last group which is most popular and the one which we will now consider.

First of all it is important to understand what diametral pitch means. Diametral pitch is the number of teeth per inch of pitch diameter, or, in other words, the result obtained by dividing the number of teeth in the gear by the diameter of the pitch circle, expressed in inches. For example, a gear may have 69 teeth and the diameter of the pitch circle be 23 in.; in this case 69 teeth ÷ 23 in. gives 3 diametral pitch. Note that this 3 is not 3 in. It is important to remember this point because 3 in. would be altogether incorrect, and would result in a gear far different from that desired.

The diametral pitch of a gear usually is an even number or common fraction thereof, the most popular for mining equipment being 3, 3¼, 3½ or 4.

So far we still have that difficulty in determining what the pitch diameter of our gear is. Fortunately, certain relations exist in cut gears which greatly simplify our difficulty. Perhaps the easiest method of obtaining the diametral pitch is from the formula: number of teeth + two ÷ by outside diameter = the diametral pitch.

In other words when getting data for a new gear the electrical or mechanical man need only have a rule for measuring the outside diameter of the gear and count the number of teeth. This information will give him or the manufacturer sufficient data for determining the diametral pitch.

Example: A gear has 69 teeth and the measured outside diameter is 23⅝ in. Therefore, 69 + 2 ÷ 23.625 = 3.005. The actual outside diameter of the gear was 23.667 in., but 23⅝ or 23.625 in. was the measured diameter with the rule, which shows the diametral pitch to be 3, since the calculation with the slightly inaccurately measured outside diameter indicates close to 3 and far distant from either 2¾ or 3¼.

An Advantage of the Reactive-Factor Meter Over the Power-Factor Meter

WHEN buying switchboards and equipment for alternating-current systems we frequently have the choice between power-factor meters and reactive-factor meter. All of our meters at present are power-factor meters, yet I would be pleased to have a discussion of these two meters in your paper.

PURCHASER.

A discussion on these meters would no doubt be interesting. The subject of power-factor is one which most customers were introduced to by the power companies during the war. Many coal operators had not given much thought to the matter of power-factor and are now paying the costs. The question of high wattless current in the lines and equipment is not only a live one for the purchaser of power, but also for the isolated power plant at the mine.

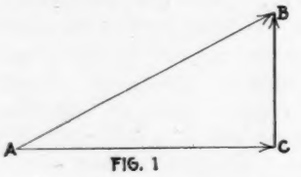


FIG. 1

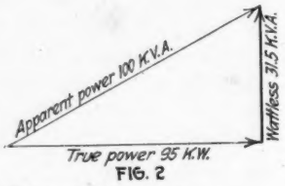


FIG. 2

FIGS. 1 AND 2 SHOW VECTOR RELATIONS

In Fig. 1 the ratio $\frac{AC}{AB}$ represents power-factor and $\frac{BC}{AB}$ reactive-factor. Fig. 2 shows a condition of high power-factor but a large proportion of wattless kva.

The principal difference between the power-factor meter and the reactive-factor meter is that one indicates a ratio between true power and apparent power, sometimes called the cosine; while the other indicates a ratio between the wattless component of apparent power and the apparent power, called the sine.

With reference to Fig. 1, power-factor is the ratio AC ÷ AB, while reactive-factor is the ratio BC ÷ AB. In the figure AC represents true power, BC wattless component and AB apparent power.

Under some conditions the reactive-factor meter seems to be the more desirable; to illustrate, Fig. 2 shows a right triangle representing 95 kw. true power, 31.5 kva. wattless component and 100 kva. apparent power.

The power-factor meter under these conditions shows 95 per cent, while the reactive-factor meter shows 31.5 per cent. In this case the power-factor meter reading of 95 per cent is good, but althought it is what is called good, it does not give any indication of the amount or ratio of the wattless component, which it will be observed is one-third of the true power, thus indicating that the wattless component is of a very appreciable amount.

Why Choose 440 Volts for Distribution Instead of 220 Volts?

WE HAVE a new bank of transformers for use on a new line which can be laid out for 220- or 440-volt equipment. The bank of transformers has a secondary winding suitable for either 220- or 440-volt connection. What are your recommendations as to which voltage we should use? REPAIRMAN.

From the question as presented it is probable that the equipment to be used on this line will consist for the most part of induction motors.

Induction motors are made to operate satisfactorily on 10 per cent under-voltage or 10 per cent over-voltage. This being the case the low limit of voltage on the 220-volt motor is 198 volts or an allowable 22-volt drop; the low limit of voltage on the 440-volt motor is 396 volts or an allowable 44-volt drop. The 440-volt motor therefore gives us twice the permissible voltage drop allowed the 220-volt motor.

For a given load the current at 440 volts will be half that at 220 volts; therefore the size wire, from this point of view alone, would be half that for the 220-volt load.

The two factors of greater permissible drop in volts and reduced current in favor of the 440-volt system mean that the size wire for the 440-volt distribution need be only one-fourth that required with 220 volt.

Get out your pencil and paper and figure this out for your personal satisfaction; it is an interesting point.

As a result of such advantages and economies the development in the application of alternating-current is along the lines of higher voltages. A few years ago it was considered a dangerous and novel feat to use 2,300 volts in the mines but today it is common to operate even small motors at 2,300 volts or higher, thus obtaining better operation from the equipment.

Reforesting Denuded Timber Land a Means of Reducing Freight and Material Costs of Roof Support*

Timber Shortage in Sight—Trees Should Be Cut When Mature, Leaving Smaller Trees Uninjured for Later Cuttings—Individual Better Than State Ownership—Ill Effect of High Local Freights and Excessive Taxation

By E. S. Stackhouse†
Shickshinny, Pa.

THE growing scarcity of timber of all kinds and the increasing exhaustion of producing areas brings to our attention problems regarding the cultivation, production and marketing of timber, not alone for general use but more especially for mine purposes. Particularly acute is the need of the anthracite districts of Pennsylvania. The policies of the past have brought about present conditions, and it goes without saying that these are far from satisfactory. As we look back on the last thirty to forty years we can see in relation to our timber supply nothing but blunders and neglect, ignorance and wastefulness.

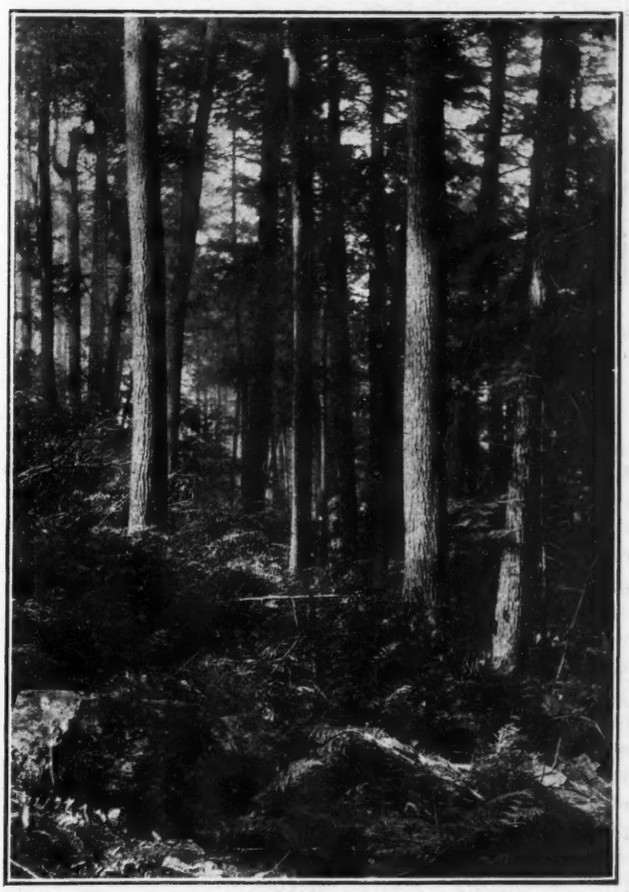
A resource and an industry of prime importance has been allowed, through get-rich-quick methods, to dwindle into insignificant proportions just as the need for its ministrations is greatest. Would that man's foresight might be at least in small measure equal to his hindsight. The trouble is that during this period there has been no broad policy at all and nothing constructive until within the last few years and the efforts made since the importance of the issue has been recognized have all been too puny to stay the big economic fact that a timber shortage is in sight.

A Spoliation and Restoration Forest Policy

The government has adopted a policy of conservation which, however, applies largely to the Western domain. Pennsylvania and other near-by states as well as the larger coal companies have adopted a reforestation policy and are carrying it out vigorously. This takes the land after it has been denuded of its timber, and by a long, tedious and costly process restores in part its timber productivity, but the pity of it is that forest lands should ever have been allowed to become a wilderness when a far-sighted constructive policy in their handling would have kept them forever in a productive state. This is a crime against civilization and posterity, and, as usual, our children will pay the bill. It is worth our while even in this late day to examine the matter critically and to see what may be done to ameliorate the situation—to study how we may change our present destructive policy to a constructive one. The two main elements which enter into this problem are wrong methods of cutting and neglect.

The section in question, the northeastern portion of the United States, has been blessed with some of the finest forest-growing conditions in the world, with a great variety of timber growth well adapted to the varied needs of its inhabitants. The conifers which so abundantly clothe its valleys are easily reproduced in a natural way by seedlings as quickly as an opening is made in the ground, and the hard woods which cap its hills and ridges immediately respond through sprouting to the great laws of reproduction. Nature has done well, but man has deliberately defeated her most beneficent plans. He has walked with the precision of a devastating army throughout the length and breadth of the land and for the sake of a little quick gain, which has been followed by neglect, has absolutely destroyed a golden heritage, a most precious possession—the reproductivity of our forests. The devastation of the Germans was child's play to the destruction wrought by the "lumberjacks" in our own land during the past fifty years.

But as we talk time passes. It serves no good purpose to dwell on the mistakes of the past except as we learn the lessons they teach. Our problem now is to



TREES ON AREA REFORESTED AND GUARDED FROM FIRE.
Scene on the property of the Kingston Coal Co. The average smoker or hunter might hesitate to devastate a thrifty growth of timber like this but he counts the early stages of timber development as of little importance and throws his matches and builds his fires without scruple.

*Article prepared for *Coal Age* but read before Foresters' and Timber Owners' Meeting at Wilkes-Barre, Pa., an assembly at which most of those present were interested in the development of the burned-over and reforested lands of the anthracite companies.

†President, E. S. Stackhouse Coal Co.

look into the needs of the future and prepare as best we may by wise, constructive and courageous action to meet them. In order to accomplish this we must analyze somewhat our present methods of cutting and make such changes as the conditions demand. It would seem that in the serious situation now facing us every branch of the trade—owner, producer, dealer and consumer—would cheerfully co-operate in any common-sense methods that would conserve their interests for the future and perpetuate their chosen industry.

We have inherited an entirely wrong conception of handling our timber lands, coming down from the days

ARTIFICIALLY PLANTED AREA AFTER A DECADE OF PROTECTION AGAINST FIRE

European larch of 10 years' growth may be seen in the rear. In the foreground is Norway spruce of 9 years' development. These trees are on the property of the Kingston Coal Co.

of our unlimited primeval forests. Methods that might have been excusable in those days may be absolutely inexcusable in the changed relations of the present. Germany, France, Switzerland and other European countries have long since been forced to adopt improved methods, and our time is at hand. Will we have the courage and determination to enforce those measures which are absolutely necessary to conserve our already sadly depleted forest reserves?

Planting forests is all right but the old adage applies—an ounce of forest conserved is better than a pound of forest planted. Coming back to basic facts, the trouble is that by wrong methods we are destroying our forests by wholesale. We cut them clean and then abandon them. We kill them ruthlessly and then do not even obtain the services of an undertaker to care for the remains. Then along comes the kindly disposed, fatherly State, takes over the corpse and by ample funds, tender nursing, loving care and watchful waiting, attempts to bring the dead to life again. I submit that this is not fair, that it ought to stop and stop quickly. The love for quick gain ought to submit to a broad conservation policy for the good of all.

Such methods of cutting as will preserve our forests should be put into practice. Provision should be made for the reproduction of timber and every protection against fire afforded. When this is accomplished we can look forward to a time when the forest growth will take care of the people's needs, which will, of course, adjust themselves to the supply. Then our forest problem will be placed on a sound economic basis instead of the uncertain, slipshod, headlong conditions now prevailing. The methods needed are exceedingly simple. To apply them is not so easy.

First of all, education is necessary, to create a wholesome public sentiment that will welcome and stand by any measures necessary to the end in view. It is surprising how a new policy will change the whole attitude of a people. Evidence of this may be found in the public viewpoint as to forest fires. The "Smith and his woods be damned" attitude has changed to "I'll be glad to help you put it out." Every timber owner and lumberman realizes the devastating effects, the losses, the ruin of present policies and, I believe, would submit more easily than we think to a curtailment of his privileges and a slight regulation of his methods to the advantage of all. He would soon learn that his interests in improved methods would be largest of all for it would protect him by assuring him that his industry would last indefinitely. The public is ready right now, in my judgment, for such action as would assure protection to our remaining forests.

Every Clearing Should Be Proved Necessary

Broad visioned and firm, yet fair and practical legislation should be passed and strictly enforced preventing any owner from cutting any forest clean except for a clearing that can be justified. No cuttings should be allowed under certain limitations except for improvement purposes. The protection of young timber should be encouraged in every possible way. By this method the conditions of the problem would be radically changed. All privately owned forests would immediately become part of a general conservation system. Every forest owner would stand for protection on account of the equity which he is forced to retain in his forest. The general indifference to cut over land would give place to an increasing interest and to a careful study on the part of owners to get by prudent management the greatest productivity from their holdings; self-interest thereby advancing conservation.

The greatest force for conservation remains with individual owners. They should be encouraged, instructed, urged and legislated into handling their forests in the interest of conservation. In the final analysis it is their job, and I submit that a host of interested owners scattered all over the state, living mostly near their holdings, incited by self-interest and economy can better work out this problem than the State. It is a question that belongs to the State only should others fail. The Commonwealth cannot do it as well nor as cheaply and should not undertake it except as a last resort. What has been done by Pennsylvania and other states has been forced on them by the mistakes of private ownership.

It is not my intention to discuss the importance of care in culling, cutting and handling to protect the younger growth and the importance of greatest and best utilization. These are details of the general prob-

lem of conservation and bear an important part in the policy as a whole.

Other matters now may be suggested whose influences are not so obvious, but are nevertheless real in their bearing on the question. One is the fact that the local railroads serving the territory in question, the anthracite coal roads, are discriminating heavily against local timber shippers in their rates and favoring shippers of the South and West. They probably have their own arguments for this policy, but I venture to say that in arriving at their conclusions they have not taken into consideration the influence which a fairer rate, meaning a greater realization to the local timber owner, would have had on his attitude toward conserving and preserving his timber supply.

I wish to suggest that a close community of interest should and must obtain between the consumer and the grower of wood products if the best results are to be attained. The purchaser should understand the problems of the lumberman in his relation to the general conservation scheme and be willing to adjust himself in as far as he can to the interests of the scheme as a whole. He may have to discard some of his old customs, theories and requirements, but he will be glad to do this when he sees the interrelation of his business with the conservation idea.

Purchasing Agents Should Aid Timber Men

One of the most important groups in local timber conservation should be the anthracite coal companies' timber purchasing agents. They are being forced by economic conditions to open their eyes to the problems involved, but if they were fully awake there would be less discrimination and greater co-operation in their contact with timber growers. To cite one instance, if during the devastation caused by the chestnut blight the purchasing agents had found ways and means to use more of the dying chestnut in lumber and mine timber, thousands of cars of valuable forest products which have been going to waste could have been substituted for other material which might then have stood untouched for the future, when it will be so badly needed.

The tax question is most intimately associated with forest conservation where this work is being undertaken by individuals. The State has a great advantage over the private owner, but inasmuch as it is greatly concerned that individual owners shall practice conservation and reforestation, every effort should be made to lighten the burden on forest lands undergoing rehabilitation or subject to conservation. A long series of years must elapse while nature by a slow process restores the wealth which has been taken from the land. Forest lands on which conservation methods are practiced are put at a great disadvantage because the costs of cutting, skidding and hauling are higher than with the old clean-sweep methods of lumbering. As a matter of fact the interest on the investment, the taxes and the interest thereon for many years, the cost of fire protection, the hazard of investment and the long deferred return must cause any individual to pause before attempting to rehabilitate in forest growth a denuded piece of land. Finally to cap the climax the federal government, according to present laws, comes along and says that when the long-deferred harvest is reaped from lands purchased since March 1, 1913 (that deadly dead-line date), the original investment alone, which is only a small fraction of the total investment constantly increasing by accruing interest, can be depleted and that all other net returns are subject to federal income taxes. In the face of conditions such as these it takes a courageous investor and one of large faith to attempt forest rehabilitation on any considerable scale. The whole problem is so acutely serious that all who are familiar with it should unite to obtain a fair show to the man who seeks to perform a great public service and at the same time obtain a practical and sound investment for his posterity. Our own and other states have done much to lighten the tax load on land under timber, but the problem is one that goes to the heart of conservation and deserves careful thought and action especially in its relation to federal taxes.

The railroads and mining companies are showing greater interest in forest protection. Nevertheless one of the principal causes of fires is the cloud of ashes from their locomotive stacks. These in both large and small locomotives should be equipped and carry at all dangerous times some form of spark arrester that will arrest. Many mining companies as well as the railroads every year through sheer carelessness unnecessarily burn over thousands of acres.

ALL THAT REMAINS AFTER A FOREST FIRE

The ground, no longer protected by trees or leaves is easily swept away by drenching rains, filling up the water courses and giving any future vegetation reduced humus for sustenance. Many years will be required to overcome this handicap.

A pointer should be given to forest owners whose chestnut has been destroyed by the blight. The roots on this land are now sprouting and forests of the same kind of tree probably will ultimately be re-established. We believe that many of these sprouts will be immunized from the blight, just as mankind is freed from certain diseases by once having been subjected to them. We are becoming more confident of this each year and now have on our own lands four-year sprouts free from blight. We notice these have a lighter colored bark than those they succeeded. Let us encourage these growths in every way possible, especially in the way of fire protection, for if this land is burned over it probably will forever lose all chance of ever coming back in chestnut, which in many ways was our most valuable timber.

To sum up, let us by every force of education, encouragement and law protect our remaining forests from denudation. Let us make it easy and profitable to conserve timber and thus encourage forest rehabilitation and conservation by individuals and corporations, and wherever the people fail individually to promote these ends, let the State carry forward its splendid plans to reforest those large areas which were so blindly denuded many years ago.

Problems of Operating Men

Edited by James T. Beard

Coal Brokers vs. Co-operative Sales Agencies

Possible Valuable Service of Coal Brokers Not Fulfilled in the Past—Little or No Invested Capital—Co-operative Sales Agencies Needed

IN SUPPORT of the brokerage system of marketing coal, which has grown to large proportions during the past few years, M. R. Atkinson writes in an interesting manner, *Coal Age*, Mar. 22, p. 493; but his arguments are not convincing to my mind.

It will be readily agreed that the coal broker does, under present marketing conditions, fill an economic need. He renders, to both the industry and the consumer alike, a distinct service by giving the buyer a wide variety for selection and the operator a broader market for his products. It cannot be denied, however, that he has not been scrupulously conscientious in the performance of this service or that it has not been economical in respect to the public or beneficial to the industry.

Logical Result of Brokerage Systems

It is probable that an unbiased survey of coal-market conditions covering the past few years would show that the brokerage system is largely responsible for the public antagonism to the mine owner. During periods of coal shortage the broker has skimmed the cream from the profits of the mine owners and fleeced and outraged the public.

Analysis, I believe, will show that this is the logical and unavoidable outcome of the system. The broker has no heavy investment in mines and equipment, and takes no special interest in the establishment and maintenance of those valuable commercial relations between producer and consumer that insure fair prices and an honest product. His actions are governed largely by the desire for immediate profit.

If this is the true condition in respect to the brokerage business the best interests of the producer and the consumer alike can be served by the complete elimination of the coal broker and the setting up of other machinery or employing methods that will perform a more useful service than the broker has yet rendered the industry. The functioning of a properly organized system would certainly be free from the evils inherent in the brokerage system.

Co-operative Sales Agencies the Remedy

The solution that most readily suggests itself to my mind is the organization of a system of co-operative sales agencies, in the different fields, sufficient to take care of the output of those mines whose production is too small in volume to justify the maintainance of a private sales office.

This would probably embrace not more than twenty per cent of the total production of the district; but the efficient distribution of even this proportion, at a fair price, would do much to clear the entire industry of the charge so frequently made of profiteering and unfair dealing.

The co-operative sales agencies would be financed by the mine owners and the actual selling expense would be added to the mine price. This would insure lower prices to the consumer and in many instances, better profits to the operator.

————, Ky. KENTUCKY OPERATOR.

Superstition Giving Place to Facts

Beliefs of early miners in the supernatural—Advance in knowledge dispels superstitious fears—Risks common to mining to be avoided.

SOME time ago, I remember reading an interesting article that dwelt on the superstitious beliefs of miners, having particular regard to accidents in mines (*Coal Age*, Vol. 22, p. 326). Since reading the article, I have done considerable thinking along this line and recall many things that have occurred in my own experience in that connection.

It is only fair to say that when first going into the mine, years ago, I possessed many of the same superstitious fears and beliefs. Among a large class of miners many of these beliefs still prevail and influence, to a large extent, both their lives and actions.

Many a time have I heard a miner say, "I don't feel like going into the mine today. I have a fear that something is going to happen." Still, the man would go in and nothing unusual took place.

No Wonder That Not Knowing the Causes Mine Occurrences Excited Fear

In the early days of mining, mysterious noises were heard in the coal; strange occurrences were observed in sections of the mine; lurid flames would burst forth in volume, leaving sulphurous fumes that could not be breathed; lights would go out and could not be relighted; and miners would become unconscious and die from no apparent cause. Is it strange that the poor miner, ignorant of the conditions that surrounded him in the mine, ascribed these doings to spirits or the work of a gnome?

There is a one common belief among miners that I first learned when a boy. A number of old Welsh miners told me that when the rats begin to leave a section of the mine, it is time for the men to go. They said there is sure to be a heavy cave in that section when the rats are seen to scamper for other quarters.

Perhaps there is more reason for this belief than for some others I could mention, inasmuch as these rodents run up and down the timbers and invest every nook and crevice of the workings. They are alert to

every noise and movement about them and it is not so strange that they should leave the place in a body when danger was imminent.

Not so reasonable, however, was the claim of some miners, who found their oil cans running low, that these knowing creatures would run their tails down the spouts of the cans and then lick the oil from their tails. The idea was a curious invention of the mind and not given general credence.

Advance in Mining Knowledge Explains Mysteries of the Mine

The rapid advance in the knowledge of mine gases and geological conditions, a little later, served to explain many of these mysterious (?) happenings. The discovery of the presence of mine gases explained both the lurid flames and the suffocating effects that produced unconsciousness and death when there was no apparent cause; while the mysterious noises heard were shown to be the working of the strata following the extraction of the coal.

It is hard to understand how intelligent miners will still hold to the belief mentioned by Mr. Edwards in the article to which I have referred, that "if a fatal accident occurs in a mine two more are sure to follow." The better judgment of men should teach them that the occurrence of a fatal accident has nothing to justify the claim that others will follow. Neither does an accident on the first trip down into the mine, in the morning, forecast bad luck for the day.

Let an accident occur in a mine and you will frequently hear a miner remark, "I just felt it in my bones that something was going to happen today." It is an easy matter for us to say, after a thing has happened, "I told you so." But, if such a presentiment was true, it should have had the effect of a forewarning that would have avoided the occurrence.

Let us come to believe and understand that behind every occurrence there is a reasonable cause and put aside the superstitious beliefs that have no basis in fact. For example, let us realize that the lack of ventilation in a gassy mine forecasts a gas explosion. Or, taking no precautions in the operation of a dry and dusty mine, especially where the coal is blasted with black powder, means, sooner or later, a dust explosion.

Failure of Officials and Men to Perform Duties Brings Disaster

Failure to properly timber a treacherous roof, or to make suitable provisions for safety on haulage roads and travelingways, or a failure to enforce safety rules and regulations, each and all spell disaster in the near future.

Not long ago I was looking over a mine with the foreman when we came to a bad fall, in an old abandoned working. Though the roof was hanging in a dangerous manner, the foreman insisted on going over the fall and went over alone, as I refused to take the risk, there being nothing to be gained by so doing.

With reference to the statement: "When a man takes a job in a mine he assumes his own risks," it is true there are many risks in the mining of coal. However, it does not occur to me that miners are any more indifferent to the dangers pertaining to their calling than are workmen of other occupations.

Compare, for example, the iron worker driving bolts at the top of a fifteen- or twenty-story building in the course of construction. While he is indifferent to the danger of his position, the same man would not consent to work in a mine, because of its assumed danger. On the other hand, the miner could not be induced to expose himself to the danger of working astraddle of an iron girder several hundred feet above the ground.

Each of these workers regard the other's occupation as a more dangerous calling than his own. The truth of the matter is that continued exposure to these dangers has a tendency to make the worker disregard them. While it is well for every worker to have a wholesome regard for the danger to which he is exposed, a superstitious fear or dread of impending danger has no tendency to safeguard the miner or make him immune from accident. My observation is that men who are naturally nervous and fearful of accident are, perhaps, more subject to such occurrences than those who are less concerned, regarding their own safety.

John Rose.

Dayton, Tenn.

Avoiding Squeeze in Miller Seam

Soft nature of coal invites squeeze—Action once started difficult to control—Good barrier pillars needed to safeguard entries.

ONE of the essential things to be borne in mind when laying out or planning the inside workings of a mine is the liability to a creep or squeeze in the later development of the mine. This thought has been impressed on my mind, particularly by reading the several letters regarding the working of the Miller seam, in Pennsylvania.

Those familiar with the conditions existing in that seam know that the coal is of a soft nature and crumbles readily. To make matters worse, the seam is underlaid with fireclay and when this becomes soaked with water, in the working of the mine, it is not able to withstand the heavy roof pressure coming on the pillars.

We all know that a creep or squeeze once started cannot be stopped in that particular place. All that can be done is to keep it from spreading to other sections of the mine. This may often be accomplished by the rapid extraction of pillars over a considerable area, so as to give sufficient room for a good clean break to take place in the roof.

Much will depend on the strength of the overlying strata. If the roof is tough and strong it will be necessary to extract a number of pillars, in a group, before a good clean break will occur. Following such a break, there will seldom be any further trouble from squeeze, provided the pillars are taken out clean and no stumps or timbers left standing in the waste.

Protection by Good Barrier Pillars

I have referred to the need of a good plan in laying out a mine and want to say, here, that the barrier pillars protecting the main headings should not be less than 150 ft. in width and the entry pillars at least 40 ft. wide if squeeze is to be prevented in working the Miller seam. On panel entries the barrier pillars should be 100 ft. in width.

While these dimensions may seem unnecessarily large, they will serve to arrest a squeeze should one occur, and prevent its crossing the headings. Where this system is adopted, I would favor driving the rooms and extracting the pillars as the butt headings are advanced. But room pillars should never be extracted closer than 40 ft. from the butt headings.

On the other hand, if there are no large barrier pillars left for the protection of the main and panel headings, I would drive the butt headings to the limit of the panel, before turning any rooms. The rooms should then be started from the inby end of the heading and when a sufficient number of these have reached the limit, the pillars should be drawn back in a group of six or more, so as to provide a good area for breaking the roof. I feel sure that such methods as these, if followed, will prevent any disastrous squeeze or creep.

Kantner, Pa. GRIFF GRIFFITH.

Standard Rule for Estimating Available Tonnage of Coal per Acre

Improved methods of mining have given increased extraction of coal—Old rules for estimating available tonnage per acre no longer apply.

REGARDING the question of formulating a standard rule for estimating the tonnage of coal available, per foot-acre, in a given property, as suggested by J. F. Healy, *Coal Age*, Feb. 15, p. 302, it seems to me that his assumed arbitrary figure of 1,800 tons per foot-acre will not fit all cases.

It is true, as Mr. Healy has stated, that this figure should be multiplied by an assumed percentage of extraction, which will allow for the different results obtained in the mining of coal. But there is another factor that must be taken into consideration before we can establish a general rule that will cover all conditions. We must allow for the varying hardness or specific gravity of the coal.

Reports of the U. S. Geological Survey and the Bureau of Mines show that the specific gravity of bituminous coal varies from 1.21 to 1.44, in different localities. Estimating on a short ton of 2,000 lb. and taking a coal of specific gravity 1.21 weighing $1.21 \times 62.5 = 75.6$ lb. per cu.ft., the number of cubic feet per ton of this coal would be $2,000 \div 75.6 =$ say 26.5 cu.ft.

Again, making the same calculation for a specific gravity of 1.44 shows that such coal would weigh $1.44 \times 62.5 = 90$ lb. per cu.ft., which gives $2,000 \div 90 =$ say 22.2 cu.ft. per ton. The tonnage per foot-acre, in the first case, is $43,560 \div 26.5 =$ say 1,644 tons. The estimated tonnage in the second case is $43,560 \div 22.2 =$ say 1,960 tons.

Clearly, the average figure of 1,800 tons, per foot-acre, lies between these two estimates and is only for use in making a rough estimation of the available tonnage when the specific gravity of the coal is an unknown or an undetermined quantity.

The point to which I wish to draw attention is that, in order to make an accurate estimation of the available tonnage, per foot-acre, it is not only necessary to know the percentage of extraction of the coal; but the estimate must be based on a fairly close value representing the average specific gravity of coal in the seam.

University, Ala. H. D. PALLISTER.

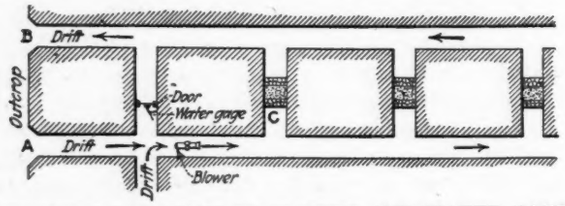
Inquiries Of General Interest

Effect on Water Gage Outby of Blower

Small Blower Located Inside Drift Mouth — Position of Water Gage Outby of Blower — Effect on Gage in this Position

IN A SMALL drift mine where I am employed, the ventilation is secured by means of a small blower located just inby from the mouth of the drift. The arrangement is shown in the figure, which though roughly drawn will help to make my meaning clear.

Not long ago, I attempted to get a water-gage reading, for the purpose of estimating the power on the air



SHOWING POSITIONS OF BLOWER AND WATER GAGE

and showing what efficiency we were getting from the blower installed in the drift. As indicated in the figure, the water gage was placed on the main door, in the first crosscut between the intake and return entries and, in this position, was outby from the blower.

Much to my surprise, the gage gave no reading and it looked to me as though a logical conclusion would be that we were getting no efficiency from the blower, though that hardly seemed to be the case, inasmuch as a fair current of air was passing in the mine.

Kindly explain why it is that the water gage gave no reading where it was placed. Also, explain where the gage reading should be taken for the purpose of determining the power on the air. W. B. L.

Besoco, W. Va.

The reason that the water gage gave no reading, in the position indicated in the figure, is that the pressure on both sides of the door where the gage was placed is practically the same; namely, the atmospheric pressure. Referring to the figure, the air entering the mine at *A* is under the atmospheric pressure, until it has passed the blower where the pressure is increased by an amount due to the action of the blower. This increase of pressure is the measure of the mine resistance, which is its cause.

Starting from the blower and following the air current in its course throughout the mine, the pressure moving the air decreases regularly as the resistance becomes less and less, until it is finally *nil* at the mouth of the discharge opening marked *B* in the figure. It is, therefore, clear that the pressure on the air both at *A* and *B* is only that of the atmosphere and, there being no difference of pressure, there can be no water-gage reading at that point.

In order to obtain a water-gage reading representing the resistance of the mine, the gage must be moved to a point inby of the blower, say at the second crosscut, marked *C* in the figure. Or, a partition could be erected at the blower and arranged so that all of the air passing sufficient size to make this arrangement practicable. into the mine must pass through the blower, if it is of In that case, the water-gage reading would be taken on the partition erected at the blower.

Examination Questions Answered

Examinations Under the Mine Act, Alberta, June, 1922

(Selected Questions)

QUESTION—*How should a safety lamp be treated when found to be full of flame as the result of being in an explosive mixture?*

ANSWER—Should this occur in the examination of a mine for gas, it will require much presence of mind, on the part of the fireboss or person holding the lamp, to avoid the danger that is imminent. Any quick movement, particulardly in a sidewise direction, would be apt to force the flame through the mesh of the gauze and ignite the gas surrounding the lamp. The lamp should be lowered promptly but cautiously, holding it in an upright position and making no quick movement, which would increase the danger. In no case should the lamp be permitted to remain in the mixture, as the gauze would quickly become heated and the flame pass through the mesh, thus causing the lamp to fail.

QUESTION—*When the fireboss reports in his record book certain dangers he has discovered during his examination, what would then be your duty as mine foreman? If the report applies to the old workings, state how you would proceed.*

ANSWER—The law makes it the duty of the mine foreman to take immediate steps for the removal of the danger, if that is possible. In case it is not practicable to remove the danger at once, it is the duty of the foreman to withdraw all men working in proximity thereto or who may be in any way endangered by reason of this condition. The foreman must see that the place is safeguarded so that no one will run into the danger, not knowing of its presence.

Assuming that the danger reported by the fireboss exists in the old workings of the mine, the fireboss must act according to his knowledge of the situation and take prompt measures to insure the safety of the live workings. In any case, he must make sure that no air passing through the old workings finds its way into places where men are working. The investigation may show the need of sealing off the old workings, or changing the ventilation in such a manner that the air circulating through them will be conducted at once into the main return and pass out of the mine. There must be no delay in safeguarding the situation to avoid possible accident from poisonous or explosive gases finding their way into the live workings of the mine.

QUESTION — *What quantity of marsh gas in air crowded with coal dust will make the mixture explosive? Can this quantity be detected on the flame of a safety lamp?*

ANSWER—An atmosphere crowded with coal dust may be a dangerous condition though no gas is present. The danger will depend on the fineness and inflammability of the coal forming the dust cloud. The fine dust of a highly inflammable coal when held in suspension in the air will readily be ignited by the flame of a blown-out shot or the flame of an ordinary shot when black powder is used, no gas being present. Again, a dust cloud of a less inflammable coal would be rendered dangerous by reason of the presence of a small amount of gas, when neither the dust cloud or the percentage of gas present would be dangerous of itself when present alone in the mine air. Such a small percentage of gas would not ordinarily be detected on the flame of a safety lamp.

QUESTION—*Will coal dust extend a mine explosion throughout the entire mine in the absence of explosive gas?*

ANSWER—Yes. A local explosion of coal dust occurring at the face of a working place will often be propagated throughout the entire mine if the conditions are favorable. That is to say, if the timbers, walls and floors of the roadways, air-courses and travelingways throughout the mine are covered with fine dust and no means have been taken for its removal, with a view to making the mine safe. The extent of the propagation will depend very largely on the fineness and inflammability of the dust, assuming no gas is present. Any isolated accumulations of gas will greatly assist in the propagation of the flame.

QUESTION—*Give your opinion of the best method of rendering coal dust harmless.*

ANSWER—Experiments of the Bureau of Mines have shown that a harmless condition of fine coal dust is only attained when the dust is so wet as to become so plastic that it can be molded in the hand, which is hardly an obtainable condition in mine practice. An adequate distribution of fine stone dust or salt has been found efficacious in reducing explosive conditions in dry and dusty workings. This is not to say that a good spraying system is without benefit in such mines.

QUESTION—*Give your opinion as to the best method of humidifying the air in mines.*

ANSWER—The most successful means to this end is the introduction of steam in the intake current, after the latter has been heated to increase its capacity for absorbing and holding moisture. The air entering the mine is made to pass over steam coils arranged in the mouth of the air course. The steam is allowed to escape from the end of the pipe where it strikes a baffle or curtain to effect a better distribution in the air and a more complete saturation of the air current.

QUESTION—*What percentage of relative humidity would you consider necessary to render a dusty and gaseous mine safe?*

ANSWER—A high percentage of humidity is always desirable in working a dusty mine generating gas; but humidity alone will not make such a mine safe. The best working conditions are attained when the mine air contains from 60 to 70 per cent of moisture. In addition to this care must be taken to prevent any accumulations of gas or dust and to enforce strict regulations in regard to blasting, besides maintaining an ample ventilating current.

Corrections—In the reply to the third question (Mar. 1, p. 381), the second part of the answer should read as follows:

(*b*) The velocity of the air current being 350-ft. per min., the volume of air in circulation is 350 (8 × 12) = 33,600 cu.ft. per min.

Again (Mar. 8, p. 419) in the reply to the third question from the last on that page, the third line should read: 675 ÷ (1 — 0.04) = say 703 ft. per min. This would make the last line of the answer read: 703 × 66 = say 46.400 cu.ft. per min.

March Anthracite Output Equals Record

Anthracite production in March, according to the Geological Survey's revised estimate, based on final data of shipments in that month, was 9,382,000 net tons, including mine fuel, local sales and dredge and washery output. This figure equals the previous high record of monthly production made in March, 1918. An output of 9,000,000 tons per month has heretofore been attained only in the months of March, June, August and October, 1917, and in March, July and August, 1918, which were years of maximum anthracite production and also times of very large washery output.

The total production of anthracite in the coal year 1922-1923 was 56,576,000 net tons, 36.4 per cent less than in the coal year 1921-1922 and 38.3 per cent less than the average for the past nine coal years.

PRODUCTION OF ANTHRACITE IN MARCH AND TOTAL OUTPUT FOR THE COAL YEAR
(In Net Tons)

Coal year	March Production	Cumulative Output Coal Year to March 31
1913-1914	6,863,000	88,323,000
1914-1915	6,654,000	90,298,000
1915-1916	7,964,000	93,318,000
1916-1917	9,026,000	87,949,000
1917-1918a	9,382,000	100,372,000
1918-1919a	5,190,000	92,790,000
1919-1920	7,935,000	91,790,000
1920-1921	7,677,000	91,130,000
1921-1922	8,757,000	88,909,000
1922-1923	9,382,000	56,576,000

(a) Years of very large washery production.

New Production Records Made in March

Record productive activity in both raw and finished products occurred in March, according to the Survey of Current Business reprinted from *Commerce Reports*, while an increasing consumptive demand apparently digested the goods produced without an appreciable increase in stocks. Cotton consumption and pig-iron production broke all previous records since data for these movements have been available, exceeding even the high records made during the war. Steel-ingot production and locomotive shipments were the highest since 1920, and unfilled orders for locomotives made a new high record. Zinc production was the highest since 1917. March production of bituminous coal was exceeded only twice since 1920—in January, 1923, and March, 1922. The production of anthracite was the greatest since August, 1918.

Retail sales both by 10c. stores and by mail-order houses surpassed all previous records for this month since 1920, at the peak of high prices. Car loadings were the highest on record for this time of year. The wholesale price index advanced two points, being the highest since February, 1921.

Consumption of cotton by textile mills in March broke all records, and at 623,105 bales was about 8,000 greater than in May, 1917, the previous high month. More spindles were active in March than in February. Export of raw cotton declined to 318,210 bales in March. Imports of cotton, exclusive of linters, declined to 53,219 bales. Prices of cotton and cotton goods made substantial advances during March. Silk deliveries to mills declined from the high point reached in February.

Pig-iron production broke all previous records in March at 3,521,275 tons, and steel-ingot production, allowing for companies not reporting, amounted to 3,888,897 tons, the highest since March, 1920. Unfilled orders of the United States Steel Corporation increased to 7,403,000 tons, the highest since January, 1921. Unfilled orders for locomotives increased to 2,316, a new high record.

The output of pneumatic tires and the consumption of crude rubber in February, which figures have just become available, were the highest on record since these statistics were established, in November, 1921.

Automobile shipments for March increased, and on the basis of shipment figures the total production of automobiles for March is estimated as 346,000 cars and trucks, the largest monthly production on record, being double that of March, 1922, and 25 per cent greater than February of this year.

The total value of building contracts awarded in 27 Northeastern States in March was $334,000,000, or about 14 per cent greater than a year ago.

The cost of building materials as represented by the Department of Labor index is still upward, while the labor shortage in the building trades is growing more acute.

Wheat movement for March was about the same as a year ago, but the visible supply was 28,000,000 bushels larger. The 1923 winter-wheat estimate of 572,000,000 bushels by the Department of Agriculture on April 1 points to the smallest crop since 1918. Prices of wheat and flour in general declined in March.

Freight-car loadings for March were not only the greatest on record for this season of the year but on a level not normally reached until about midsummer or early fall. As compared with a year ago, the March average loadings of ore were 150 per cent greater, while coal and forest products were upward of 40 per cent greater, indicating pronounced consumption of raw materials.

Byproduct Coke Output in March Reaches Unprecedented Total of 3,256,000 Tons

Production of byproduct coke in March, according to the U. S. Geological Survey, reached the unprecedented total of 3,256,000 net tons, which was 16 per cent greater than the February output and 5 per cent more than production in January. This total is based on early returns from all but one active plant and includes an estimate for one plant not heard from. The estimated present capacity of byproduct ovens is 3,725,000 tons per month of 31 days. Thus the output indicates production at the rate of 87.4 per cent of total capacity and an average of 105,042 tons per day, which is an increase of 4,692 tons, or 4.7 per cent, over the daily rate of production in February. Of the 71 plants in existence 64 were active and 7 idle.

Production of beehive coke continued on the increase in March and for the month totaled 2,759,000 net tons, an increase over February of 18 per cent. The March rate of beehive coke production was more than twice the monthly average for 1922, nearly four times the monthly average for 1921, and the same as the monthly average for 1920.

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE IN THE UNITED STATES (a)
(Net tons)

	Byproduct Coke	Beehive Coke	Total
1917 Monthly average	1,870,000	2,764,000	4,634,000
1918 Monthly average	2,166,000	2,540,000	4,706,000
1919 Monthly average	2,095,000	1,638,000	3,733,000
1920 Monthly average	2,565,000	1,748,000	4,313,000
1921 Monthly average	1,646,000	462,000	2,108,000
1922 Monthly average	2,374,000	669,000	3,043,000
January, 1923	3,100,000	1,478,000	4,578,000
February, 1923	2,810,000	1,482,000	4,292,000
March, 1923	3,256,000	1,749,000	5,005,000

(a) Excludes screenings and breeze.

The coal required for coke production in March is estimated at 7,438,000 net tons, which is more than was consumed by the coke industry in the War years 1917-1918 and is 17 per cent more than the average in the active business year 1920.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE (a)
(In Net Tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average	2,625,000	4,354,000	6,979,000
1918 Monthly average	3,072,000	4,014,000	7,086,000
1919 Monthly average	2,988,000	2,478,000	5,466,000
1920 Monthly average	3,684,000	2,665,000	6,349,000
1921 Monthly average	2,401,000	706,000	3,107,000
1922 Monthly average	3,411,000	1,056,000	4,467,000
January, 1923	4,454,000	2,331,000	6,785,000
February, 1923	4,037,000	2,339,000	6,376,000
March, 1923	4,679,000	2,759,000	7,438,000

(a) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged in byproduct ovens, and 63.4 per cent in beehive ovens.

A REPORT ON CORPORATE RELATIONSHIPS in the anthracite industry is to be made for the U. S. Coal Commission by Prof. George E. Barnett, of Johns Hopkins University. Professor Barnett is an economist, who has made a careful study of many matters of finance and is the author of various books on banking and on labor relationships.

Keeney, Mooney and Blizzard Trials to Be Held at Lewisburg May 9

Although Harold W. Houston, counsel for C. Frank Keeney, president of District 17, United Mine Workers; Fred Mooney, secretary-treasurer of District 17, and William Blizzard, vice president of subdistrict 2 of District 17, opposed it, Judge Woods in granting the request of counsel for the defense for a change of venue, designated Lewisburg, the county seat of Greenbrier County, as the place where the trio of officials should be tried, beginning May 9. All three are charged with complicity in the Logan armed march. Lewisburg is a city of about 1,200. Houston opposed Greenbrier County, contending that it was a non-union stronghold, although it is the center of an agricultural county. There are approximately 100 other defendants against whom charges are pending in connection with the Logan march whose status was not affected by the order of the court entered on April 18.

An effort was made to have the charges against Keeney dismissed on the ground that the time when Keeney might legally be tried had elapsed. Judge Woods overruled such a motion.

Confirms Payment of Damages by Union to Willis Branch Coal Co.

Judge George M. McClintic, of the U. S. District Court for the southern district of West Virginia, confirmed the report of the payment of a sum of money variously estimated at between $400,000 and $500,000, by the United Mine Workers to William McKell and others interested in the Willis Branch Coal Co. when in dismissing the suit against the miners' union in federal court on April 16 he stated that the union had paid an enormous sum in order to keep its activities from becoming a matter of public knowledge.

The suit instituted by the Willis Branch company against the union was for $1,000,000. An agreement was reached last February under the terms of which the union paid over a large sum of money to the company for the damage the union admitted had been done to the Willis Branch plant. This is said to be the first instance in which the union ever settled for overt acts of its members.

More than sixty union miners were indicted in connection with the shooting up of the town, eight of whom were convicted, and indictments are still hanging over many others. Among those implicated was David Robb, international financial agent of the United Mine Workers, who is said to have furnished $80,000 to the local near Willis Branch for furthering the reign of terror.

Dull Market in Southwest Nearly Shuts Down the Field

An idea of the extent to which mines of Kansas, Arkansas, Oklahoma and Missouri were being closed because of lack of market as early as April 1 may be obtained from reports submitted by the Southwest Interstate Operators' Association to the U. S. Geological Survey.

The banner week of the winter for Kansas was that ending Jan. 13. In that week twenty-three companies reported that 82,876 tons of coal were produced in forty-six mines. For the week ending March 31 thirteen companies reported 43,509 tons from thirty-four mines. Reports from Missouri show the same week to have been the best of the winter in that state. Fourteen companies reported a production of 42,262 tons from twenty-five mines. The week ending March 31, reports were filed by eleven companies for seventeen mines. The production was 35,169 tons.

In Arkansas 14,630 tons of coal were taken by seventeen companies from twenty-three mines the week ending Oct. 7, 1922. In one week in December twenty-one companies reported 10,206 tons from twenty-eight mines. During the week ending March 31 only three companies filed reports, these for nine mines, with a production of 3,120 tons.

Eleven companies, operating fifteen mines in Oklahoma, reported a production of 23,652 tons for the week ending Nov. 4, 1922. For the weeks ending Feb. 17 and Feb. 24, this year, twelve companies reported on sixteen mines. The tonnage was 23,288 and 17,316 for the respective weeks. Eight companies were operating nine mines the week ending March 31, and that week produced 7,493 tons.

The week of March 31 was chosen for comparison as representing the last week of normally maximum production. The reports show that even before the usual spring shutdown, lack of market was forcing a big proportion of the mines of the southwestern district to close. The same report to the Geological Survey shows that 55 per cent of mining time was lost in the Kansas field that week. Twenty-nine per cent of this was lost because of no market. Missouri mines lost 26 per cent time. Of this total, 92 per cent was because of no market. Four-fifths of the 59 per cent of time lost in Arkansas that week was because of no market. And of 89 per cent time lost in Arkansas, 89 per cent was attributed to the same cause.

Wadleigh to Issue May 1 Stock Report

F. R. Wadleigh, Federal Fuel Distributor, is preparing to bring out another stock report, as of May 1. It had been his intention to wait until June 1 before taking another census of stocks, but developments of the last week are such that he believes that the public will be benefited by showing the situation at the beginning of May.

Due to the difficulty at this time in obtaining the attendance of a number of very busy coal operators at a meeting in Washington, Mr. Wadleigh is having each member of his advisory committee write him in detail his views as to procedure in his study of storage, transportation and collective selling. This survey which Mr. Wadleigh is conducting in his capacity as Federal Fuel Distributor is going forward rapidly.

So that the public utilities may be encouraged to continue the practice of last year in providing storage, Mr. Wadleigh has called upon J. W. Lieb, of the New York Edison Co., for suggestions as to the encouragement of this practice this year.

During the study of railway transportation which has been undertaken by the Department of Commerce, Mr. Wadleigh will act as liaison officer between the department and the car-service section of the American Railway Association.

Denies Coal Commission Found Basis for Gouging Charge Against Operators

The Bituminous Operators' Special Committee on April 18, gave out the following statement:

"A recently published press report stating that the U. S. Coal Commission had made a finding to the effect that bituminous-coal prices had been increased without any corresponding increase to the operators in the costs of coal production and that the operators were gouging the public, was today officially denied by the commission.

"E. E. Hunt, secretary of the commission, in a letter to Harry L. Gandy, executive secretary of the National Coal Association, official organization of the bituminous operators, stated that he had been instructed by the commission, in the absence of John Hays Hammond, its chairman, to advise the National Coal Association that the commission had made no statement or report 'upon which such recent press statements could be based.'"

DR. GEORGE S. RICE, chief coal technologist of the U. S. Bureau of Mines, has been authorized by Secretary of the Interior Work to visit Europe during the coming summer to make a study of European mine-safety methods and to gather information as to more efficient methods of operating coal mines. Dr. Rice will leave about May 1 and will visit all the leading European countries where coal mines are operated, including England, France, Germany, Czechoslovakia and Poland.

THE BITUMINOUS OPERATORS' SPECIAL COMMITTEE began moving its offices April 18 to Room 805, Southern Building, Washington, D. C., which hereafter will be the committee's headquarters.

Germany Buys British Coal

When the French occupied the Ruhr they cut off Germany's chief source of coal. The Germans turned to Great Britain for immediate supplies. By April 1 more than 250,000 tons of British coal had been bought by Germany. This photograph shows a cargo being unloaded from the steamer into barges at Hamburg. Any time in the past three months one looking from the upper floors of the Whitehall Building, on the lower tip of Manhattan Island, could have seen a similar sight, a cargo of British coal being unloaded into harbor lighters. The difference would have been that instead of a grab bucket, as at Hamburg, he would have seen a wheelbarrow at the Battery—so unaccustomed and unprepared are we for unloading cargo coal in New York Harbor.

British Columbia Tightens Safety Rules

As a result of recent fatal accidents in the Cassidy mine of the Granby Consolidated Mining, Smelting & Power Co., and the Wakesiah mine, of the Western Fuel Corporation of Canada, regulations under the Coal Mines Regulation Act have been announced by William Sloan, Minister of Mines of British Columbia.

They provide that "every percussive air drill used for the drilling of holes in coal shall be equipped with a water jet or spray, or other appliance equally efficient, to prevent the escape of coal dust. This jet or spray to be of a type approved by the inspector of mines"; that "the use of a compressed-air jet for forcibly removing accumulations of gas is strictly prohibited"; that "when accumulation of gas is being removed, the official in charge shall see that no person or persons or lights of any description are allowed on the return side of the gas being removed, except at such a distance that the gas thus removed shall have been so completely diffused that its percentage is at that point lower than that requiring withdrawal."

They further provide that "the term 'properly fenced,' as quoted in General Rule No. 6, shall mean a fence 4 ft. high built of not less than three boards, 1x6, spaced so as not to obstruct the ventilation and nailed securely to posts. Where there are no posts on the ribs, then the ends of the boards shall be hitched into the coal at least 3 in. and securely wedged." The rules also order that "all places fenced off as required under the terms of general and special rules shall have securely attached to such a fence in a conspicuous place a danger signal properly worded, with the lettering at least 4 in. high; the lettering to be stenciled in white on dark background, both to be of durable material that will not easily become obliterated."

In one of the accidents to which reference has been made the miner lost his life through disregarding a fence and entering a prohibited working. When he was found the boards were scattered and there appeared to be some doubt as to whether they had been in place when the workman, subsequently overcome by gas, left his partner. In the other fatality loss of life resulted in the course of removing gas by means of compressed air. The regulations, therefore, are designed to meet these two sets of conditions and to avert accidents having such origin.

E. B. CHASE, vice-president of the Berwind-White Coal Co., has suffered a nervous breakdown and will be compelled to drop all business affairs for several months.

DuBois Convention Votes Against Paying Officers' Salaries During Strike

It cost District No. 2, United Mine Workers, approximately $45,000 to determine whether or not to pay the officers and field workers of the union $15,000 for services rendered during the strike beginning April 1, 1922. A convention of delegates representing the 45,000 miners of the district was called at DuBois, Pa., on April 17. After almost four days of debate on the proposition the delegates almost unanimously went on record as opposed to paying for the period. This settles the controversy so far as the last strike is concerned and the matter of making a change in the constitution depriving officers of pay during strikes was left over until the next regular convention. In the matter of officers' expenses, an amendment to the constitution carried which provides that expenses of officials, organizers and board members shall be itemized each month and that a detailed printed form of such expenses be sent to each local in the district by the fifteenth of each month.

The trouble which led to the calling of this convention had its origin at the close of the strike late last year. During the strike, officers and field workers were said to be working without pay. Following the strike and the election of officers for the district it was charged that the officers and field workers collected their entire back pay. The constitution does not provide that officers' wages shall cease during a strike but it was the hope of the opponents of the administration that the constitution might be amended at this session to make provision for such cases in the future.

The crisis in the convention came when Delegate George Bassett, of South Fork, made a motion that the officers "not receive back pay for the two and one-half months at present." The wording of the motion raised the further question of bringing the matter to a head again, regardless of how it would be decided on a vote of the convention.

Richard Gilbert, district secretary of the union, declared against the motion on the ground that it would injure the credit of the union in that it specifically stated that the union refused to pay back salaries due officers. This aroused a bitter debate among officers and delegates. Officers generally agreed to abide by the vote of the convention. Vice-President James Mark made one of the strongest speeches of the convention, arguing that the officers are entitled to the pay as a matter of constitutional right.

Mr. Mark told why the salaries were suspended and the effect in the Somerset County field. He declared the refusal to pay the salaries would put the union in a peculiar position with the public and bitterly denounced the *Penn Central News*, published at Cresson, for agitating the matter and being responsible for the calling of the convention.

When motives were questioned, President Brophy defended the officers. "Personally," he said, "I have given my services for six years as president not for the pay which is in it but because I believe firmly in the principles of unionism and your organization. The others have done this too, and it is unfair to impugn their motives."

Shots Shatter Calm of West Kentucky Strike

A fusillade of shots fired April 19 at a small party of men coming out of the Pontiac Coal Co.'s mine near Madisonville, Ky., marked the first sign of violence in the strike of about 5,000 miners in three counties of the western Kentucky coal field. Nobody was injured though an automobile carrying the little party of mine men was struck. The riflemen kept out of sight. The strike, which began April 1 after the operators of Christian, Hopkins and Webster counties insisted upon a two years' continuance of the existing wage agreement instead of a one-year term, has run smoothly up to the present. The Circle City Coal Co.'s mine at Nebo surrendered two weeks ago and signed for one year and has been working regularly. One other mine, of the Hart Coal Corporation, has gone on an open-shop basis and has been getting out a few tons each day by the labor of officials and a handful of laborers, but generally speaking the three counties have been idle.

Anthracite Operators File Brief with Coal Commission On Handling of Recent Hard-Coal Emergency

The anthracite operators on April 21 filed with the U. S. Coal Commission a brief on the anthracite emergency of 1922-1923 and how it was handled. By statement, table and text the situation with respect to production and distribution is fully set forth. Supporting documents in the form of letters from state authorities with whom the Anthracite Distribution Committee came in contact testify to the good faith and helpfulness of the hard-coal operators.

Commenting on prices the report says:

"The Pennsylvania Fuel Commission and the state and federal distributors did not stop with their efforts to secure equal distribution but also undertook with the co-operation of the operators to protect the public against exorbitant prices and unfair practices. The Pennsylvania Fuel Commission fixed a price of $8.50 per gross ton at the mines as a maximum price for so-called domestic sizes of anthracite coal and, realizing that certain operators could not produce coal at this figure, designated a Fair Practices Committee to consider individual cases and determine what should be a fair maximum price for operators who could not produce at the $8.50 price. Over 98½ per cent of the industry co-operated with the committee and accepted the prices approved by this committee.

"The State Fuel Commission also effected an arrangement with retailers that the margin of cost for handling and delivering anthracite coal should not be above that prevailing in March, 1922, and the efforts to have this policy observed met with a large measure of success. The Governor of Pennsylvania subsequently ratified and adopted these activities of the Fuel Commission and the Fair Practices Committee, at the same time declaring the existence of 'a serious public emergency.'

"Subsequently the Pennsylvania Fuel Commission circulated among the State Fuel Administrators a list of producers comprehending 98½ per cent of the production of anthracite, which were co-operating with the commission, and the prices that each was to charge, together with a warning as follows:

> We wish to bring again to your attention that certain irresponsible individuals and firms are taking advantage of the existing shortage of anthracite coal to sell to the trade inferior qualities of coal consisting of a considerable extent of bone, slate and other impurities, in many cases requiring payment in advance of shipment, or sight draft against shipping documents, and disclaiming responsibility for the quality of coal supplied, and thus protecting themselves against claims, etc.
>
> In view of these facts, the Pennsylvania Fuel Commission urges and advises all distributors and retailers of anthracite coal to purchase their coal supplies exclusively from the producers named in the list issued by the commission or from such responsible agents as will give proper guarantees that the coal sold by them comes from such listed producers. Lists of these producers will be furnished on application to the Pennsylvania Fuel Commission.
>
> Distributors and retailers are most strongly urged to follow this advice and thus protect themselves and the consuming public against the fraudulent practices referred to.

"The commission thus attempted to confine trade to legitimate producers and dealers who were co-operating with it, in order that the public might be protected against the so-called outlaw and bootlegger. The willingness of some consumers and dealers to disregard this warning in order to secure coal of any quality at any price, was the cause of the few irregularities which were so greatly magnified, but even under these circumstances the regular operator kept his record clean."

The Committee on Distribution had the co-operation of 85 per cent of the total production and was able to furnish an accurate check and supervision on the weekly distribution of this production to some 20,000 communities. Reports were furnished to each state administrator, showing the amount of coal shipped to each community under his jurisdiction the previous year, the 60 per cent allotment for the pending season, and the amount shipped during the week covered by the report, so that he could determine the total amount shipped for the season to the end of the week covered by the report.

With the exceptions noted, the co-operation of the anthracite producing companies in the work of the committee has been unique, if not without parallel in industrial history, and the work of distribution, it is believed by the operations, has been as nearly 100 per cent perfect as it was possible to make it, labor, transportation and weather conditions being considered.

Concluding, the statement says:

"As a record of self-restraint and moderation on the part of an unregulated industry, we submit this is unsurpassed. In the face of a buyers' panic and considerable hysteria which made the supply of coal and not the price of coal the first consideration of most consumers, with few exceptions this vast tonnage was produced and sold at prices which in the public interest defied the law of supply and demand.

"The opportunities for graft, profiteering, adulteration and corruption in many forms offered temptations to which too large a percentage of people often yield, but the record of this industry, so far as the legitimate producers of 98 per cent of the nation's supply is concerned, is remarkably clear.

"These operators have also co-operated in efforts to stop the shipment of so-called 'fireproof' coal. The Fuel Distributor stationed an engineer of the Bureau of Mines in the anthracite fields to secure evidence as to shipments of unmerchantable coal and it is noteworthy that the list of thirty-three different names found by him to have been guilty of this reprehensible practice does not contain the name of a real coal operator. They are merely dishonest speculators, who came temporarily into action for the purpose of fattening on public misfortune. A number of the names are but different disguises for a single headquarters. We doubt if the entire group of legitimate operators ever heard of any one of these concerns as engaged in the coal industry. For all normal purposes they are non-existent in the coal trade.

"It is submitted that even government is not proof against some corruption and favoritism and has been notoriously incapable of overriding economic laws. We contend, therefore, that no form of government control would have served the public better during the recent emergency than did the voluntary co-operation of the operators.

"The general strike described by the United Mine Workers as 'the greatest industrial dislocation in the history of the world' and which brought about the emergency with its train of economic derangements and opportunities for exploitation, may well call for regulation which will prevent repetition, but the minor evils which grew out of that derangement will disappear when the major problem of industrial warfare is brought under control."

D. & H. Celebrates 100th Birthday

Dim lights, Old Glory waving in the spotlight, a huge "birthday cake" with 100 candles, music, 500 guests and some speeches, too, marked the Delaware & Hudson R.R. centennial celebration at the Hotel Astor, in New York City, on April 23, 1923. E. H. Outerbridge, chairman of the Port Authority of New York and a member of the board of managers of the D. & H., presided. L. F. Loree, president of the Delaware & Hudson, the first speaker, attacked regulation of railroads and commissions in general as forms of "sham legislation." He was followed by James S. Alexander, president of the National Bank of Commerce, who in the course of his address defended regulation as a necessity, although he decried the direction it had taken in certain quarters.

H. W. Dickinson, of the Science Museum of London and secretary of the Newcomer Society, the guest in this country of the D. & H., was the last speaker. He traced the development of steam power from the earliest time to the first practical locomotive and Robert Fulton's steamboat.

British Coal Awaiting Shipment Inland from Hamburg

British coal is helping save the day in Germany, since France is taking all the Ruhr output. This picture of a corner in Hamburg harbor shows some of the British coal Germany is getting. So active has the demand for British coal become that the prices have risen 40 per cent in three months.

Navy Department Awards Contracts for 653,000 Tons of Coal

The Navy Department has awarded contracts for 653,000 tons of bituminous coal. Accepting tenders for coal for Hampton Roads when the quotation did not exceed $7 a ton, the Navy was not quite able to fill all of its anticipated requirements. Officials announced, however, that the remaining 100,000 tons would be bought on the open market during the next fiscal year, as it was believed that savings could be effected by purchasing "distress" coal when the opportunity presented itself.

Coleman & Co. was awarded the New York contract for 12,000 tons, the prices for the three classes being $7.27, $7.52 and $8.22 a ton.

W. L. Irish & Co. was awarded the Philadelphia contract, its prices for coal in barges under chutes being $7.33 and $7.51 for delivery in lighters free alongside.

The coal contract at Hampton Roads was distributed between four companies. Castner, Curran & Bullitt was awarded contract for 100,000 tons of coal to be delivered into storage at Sewalls Point, the price being $6.68, while the Fayette Smokeless Fuel Co. will supply 30,000 tons at $6.72.

For delivery at Lamberts Point piers, the Navy contracted to buy 408,000 tons. The Pocahontas Fuel Co. will supply 200,000 tons at $6.72, the Fayette Smokeless Fuel Co. 108,000 tons at $6.72 and the Crozer-Pocahontas Coal Co. 100,000 tons at $6.50.

The Navy desired to buy 200,000 tons of coal for storage at Sewalls Point.

Eleven proposals were submitted, as follows:

Twelve thousand tons, for delivery at New York between May 1, 1923, and June 30, 1924—Coleman & Co., Inc., Philadelphia, delivered f.o.b. vessels under chutes at piers, $7.27 per ton; delivered f.o.b. barges alongside vessels in New York harbor or at Brooklyn, Navy Yard, $7.52; delivered in lighters in New York harbor, $8.22; additional charge for coaling in regular bunkers 70c. per ton; in side bunkers, 80c. per ton; furnished f.a.s. government vessels, $8.72 in lots of less than 100 tons; $7.82 in lots between 101 and 200 tons; $7.62 in lots between 201 and 300 tons; $7.57 in lots between 301 and 400 tons; $7.52 in lots of over 400 tons; additional charge for delivery, $40 per lighter at all North River points. Imperial Coal Corporation, New York, $6.69 delivered f.o.b. vessels under chutes at piers.

Three thousand tons, for delivery at Philadelphia from July 1, 1923, to June 30, 1924—Imperial Coal Corporation: Delivered f.o.b. vessels under chutes at piers, $6.22 per ton; alternate bid, $6.49. W. L. Irish & Co., Inc., Philadelphia, delivered f.o.b. vessels under chutes at piers, $7.33 per ton; delivered in lighters, f.a.s. wharf at Navy Yard, $7.51 per ton.

Four hundred and twenty-five thousand tons, for delivery at Hampton Roads, Va., between July 1, 1923, and June 30, 1924—Crozer-Pocahontas Co., Philadelphia, 100,000 tons at $6.50. Fayette Smokeless Fuel Co., Mount Hope, W. Va., 108,000 tons at $6.72. Low Volatile Consolidated Coal Co., Beckley, W. Va.: 200,000 tons in all, 100,000 at $7.28 and 100,000 at $7. Pocahontas Fuel Co., Inc., New York, 200,000 tons at $6.72. White Oak Coal Co., Macdonald, W. Va., 72,000 tons at $7.

Two hundred thousand tons for delivery f.o.b. cars into storage at Sewalls Point, Va. Castner, Curran & Bullitt Co., Inc., New York, 100,000 tons at $6.68. Chesapeake & Ohio Coal & Coke Co., New York, 10,000 tons at $4.48. Fayette Smokeless Fuel Co., 30,000 tons at $6.72.

Lewis Confers with British Mine Leaders

John L. Lewis, president of the United Mine Workers of America, had a conference April 24 with Frank Hodges, secretary of the Coal Miners Federation of Great Britain. Details of the parley were withheld. The secrecy that has surrounded Lewis' conferences with British miners' leaders has led to the conclusion that some understanding is under consideration. Lewis arrived in London by airplane from Paris, April 23, following a miners' conference in Brussels, where the allied countries and Germany were represented. Lewis would not confirm or deny the report of a move to bring about a closer affiliation of the several miners' organizations, particularly between the American and British.

Southern Indiana Coal Fields Developing

Development of the coal fields in the southern part of Indiana is progressing at a rapid rate and just now it seems that that section lying between Terre Haute and Evansville, on the Evansville, Indianapolis & Terre Haute R.R., has prospects of becoming one of the most productive sections in the state. Improvements being made on this railroad, which is now operated by the Big Four, is going hand in hand with the development of the coal fields.

Between Petersburg and Evansville activity is greatest. The new Gray stripping operations at Oakland City with a capacity of 90 cars a day will start loading coal before long. The Enos strip mine at Oakland City recently added another shovel, which will raise its capacity from 65 cars per day to 100 cars. The Pike County Coal Co.'s new mine at Petersburg has reached a capacity of 25 cars a day and has tipple capacity of 75 cars daily, which it expects to reach by July 1. Pike County mine No. 1, at Petersburg, which has been in operation several months, recently spent about $75,000 in increasing its tipple capacity, which gives it a capacity of 75 cars a day.

The General Fuel Corporation mine No. 1, which started operations about Sept. 1, is hoisting about 22 cars daily and it is expected that this mine will be loading 50 cars a day by July 1. The No. 2 mine, which started hoisting Nov. 15, has a tipple capacity of 75 cars daily, which it expects to reach the latter part of this year. This mine, however, is loading, while under development, five cars a day. The Francisco mine, near Oakland City, started Sept. 1 and is loading 20 cars a day. It expects to reach its tipple capacity of 75 cars a day by autumn.

Negotiations are under way, it is reported, for trackage to a large operation at Buckskin, which will open 5,000 acres of new coal at an output rate of 120 cars a day. Practically all of the coal land between Petersburg and Evansville has been taken over by various companies, all of which will be opened in the near future.

A number of smaller operations are being started between Terre Haute and Petersburg. The capacity of the mines on this road now in operation is 550 cars a day as compared with 125 when the Big Four took over the properties on March 1, 1920. Car supply on the Evansville, Indianapolis & Terre Haute R.R. for February was about 70 per cent of the demand, which is the best supply for several months. The line is being improved as to trackage and power.

Governor Marshall Decries "Holier Than Thou" Attitude Of Both Sides in Probe of Coal Industry

By Paul Wooton
Washington Correspondent of *Coal Age*

So much energy is being consumed by the separate branches of the coal industry in hurling brickbats at each other that it is apparent that there is apprehension on the part of at least certain members of the Coal Commission lest in the mêlée sight will be lost of the constructive suggestions which each factor in the industry is pledged to bring forward.

Hurling and dodging missiles require such close and constant attention that it tends to preclude study and research, each of which must be undertaken intensively if the intricate problems before the industry are to be solved. Each is held to be necessary to the exercise of the requisite amount of vision to meet the situation.

There is a feeling among many federal officials who may be described as disinterested but intelligent onlookers that advantage has been taken of the commission's invitations for information to submit much material for the benefit of the gallery. No one will be surprised if the commission should consider whether or not the request for future reports should be coupled with the suggestion that they be withheld from publication.

It is obvious that the commission is tiring of the ceaseless attempts to put the other fellow in the hole. It recognizes that each side has done things that cannot be justified. It wants to know more than anything else what the parties to these controversies intend to do to prevent the recurrence of unlawful acts and of acts which cause the public to suffer. Is the conflict irrepressible? Must it go on with increasing violence? These are questions which the commission would like to have answered.

Shows Pressing Need for Harmony

The commission evidently recognizes that there can be no solution if all one side does is to say that no one may work in a mine if he does not belong to the United Mine Workers of America. By the same token, the members recognize that it is no solution to advocate severance of all relations with the United Mine Workers. It is suggested that more constructive things must be forthcoming in the next ten years than has been the case during the last decade. During that period one side has striven to get rid of the miners' organization while the other has bent every energy to unionize all mines. It is believed to be the thought of the commission that some suggestions should be brought out by those most at interest for a relationship promising a much greater degree of harmony. If they have no such suggestions and if they can offer no solution for the existing intolerable relationship, it is certain that the commission would welcome a frank acknowledgment to that effect. In such an *impasse* the government, as a representative of the public, will have to try its hand in an effort to bring about a better functioning of the industry.

It is the plan of the commission not to make public at this time the material obtained in the report made by W. Jett Lauck in connection with the anthracite situation. Governor Marshall stated on Saturday that he has made digests of records of courts and of the reports of government agencies, such as the Federal Trade Commission, the Interstate Commerce Commission and the Geological Survey. Mr. Lauck's report, setting forth what he says are deductions of fact from these documents, is being submitted to the anthracite operators. They will be given an opportunity to take issue with any statement made in the report. The commission is not accepting as facts any statements, government or otherwise. If anything purporting to be a fact is questioned, it is only common justice, Governor Marshall pointed out, to hear testimony on it.

During Saturday's hearing Governor Marshall urged the representatives of the press to be constructive in their articles on the coal situation. It is a question in which the public is vitally interested, he said, and this interest should be rewarded by an opportunity to get the real facts as to the situation in the coal industry. He stated that he is not annoyed by articles that reflect adversely on the commission. Throughout his own career, he said, his chief concern had not been with the untruthful things that newspapers said about him but fear that they might learn, and print, the truth about him. He described the newspaper of today as "the moving picture of a restless age," and fault should not be found with what the camera catches. In the course of his conversation with the newspaper men Governor Marshall said:

"When this investigation began, we were assured by everyone who had a right to speak, or who said they had a right to speak, that they would bend their energies toward assisting the commission with constructive suggestions looking to peace in the industry, justice to all concerned, and to the continuity of employment, output and distribution.

"I have no reason to believe there is any change in that purpose but I am a little bit alarmed as to whether or not the recent efforts to disclose the past history of the industry has not resolved itself into attempts to show that one side is without reproach and the other without virtue. Of course, no criticism can be offered justly against the pleading of a man's cause. The past has to be determined to reach any conclusion as to how past conduct should be changed in order to help the future, but I hope their promise to the commission is to be kept. After they have cussed each other out, I hope they then will be willing, during the life of the commission, to meet in a friendly way and assist in the formulation of such changes as will bring about not only better understanding and better feeling but which will be conducive to the good of the American people."

New Questionnaire Goes to Wholesalers

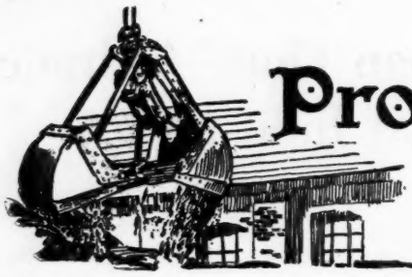
The wholesale section of the U. S. Coal Commission has prepared and sent out to wholesale coal dealers a new questionnaire designated as Form R-40 dealing with investments, profits, etc., of sales agents and wholesalers of coal. The questionnaire is quite elaborate, consisting of seven pages, in which information for the past ten years is requested as follows:

(1) Detailed information for classification of company.
(2) Data as to organization.
(3 & 4) Profit and loss statement.
(5) Analysis of wholesale coal and coke operating expenses.
(6) Balance sheet.
(7) Reconciliation of surplus account and statement of notes outstanding.

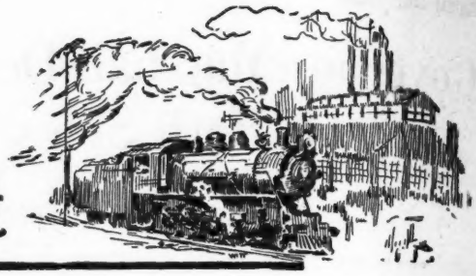
The report on Form R-40 is required by the commission only from such operators as conduct a sales agency or wholesale business involving the sale of coal other than tonnage produced by their own mines.

The Bituminous Operators' Special Committee will send speakers to the farming sections of the country during the next few months to tell the farmers why the production of coal has been seriously hampered and why this cost has mounted higher and higher since the war.

Viscountess Rhondda, the only woman director of large coal fields in Wales and also the owner of vast estates in the Principality, is disposing of part of her Monmouthshire properties. The occupying tenants were given the first opportunity to purchase and already have bought their holdings to the value of £90,000.



Production and the Market



Weekly Review

Spot prices in general continue their declining tendency. Current prices are below contract figures in some areas, as Pittsburgh, by as much as 50c., thus reflecting a normal situation for this time of year. *Coal Age* Index of spot prices of bituminous coal declined 4 points from 235 to 231 on April 23. The corresponding average price was $2.79. Buyers as well as producers appraise the outlook similarly, both calculating that as the summer passes into autumn, demand and price will mount. For the time being some buyers elect to enter the market and find steam coal available at around $2. At this price, on present wage scales, shippers are for the most part taking a loss and those who have no other outlet than the spot market are closing down their mines.

Typical of what is happening is the experience of one large company that during the severe car shortage period was obliged to prorate contract shipments. Adjoining operators without contracts were running, taking a share of the cars and selling on the spot market to the contract customers of the large producer. The spot market having fallen off, the intermittent mine is closed down, with cars of coal on demurrage, and the contract buyer is again getting all his coal where he originally bought it. Meanwhile the production in the district is practically unchanged.

Lake Movement Slowly Gaining

Present indications are that southern West Virginia non-union coal will maintain a commanding position for some time. Prices on the whole list are being well maintained and are such as will permit competition from all-rail central Pennsylvania steam coal, thus relieving, on the important New England market, a repetition of the strife of 1921.

The Lake season is slowly gathering momentum. Apparently, whatever tonnage of soft coal is wanted will be forthcoming, but on price there is no agreement generally between buyer and seller. Unless the unforeseen comes to pass, 1923 will be a comparatively light year for Eastern Lake shippers. Business is active in the Northwest, but so are coal shippers from the Middle West even as far south as Kentucky. All-rail competition has the Eastern coal-dock and coal-mine operator worried.

There is no disposition in the Middle West to run mines with prices below cost of production and many large properties and a host of small ones are already closed down. Steam-coal prices are below $2. Railroad fuel contracts have been closed at little above $2 on coals that commanded $2.50@$3 when the year began.

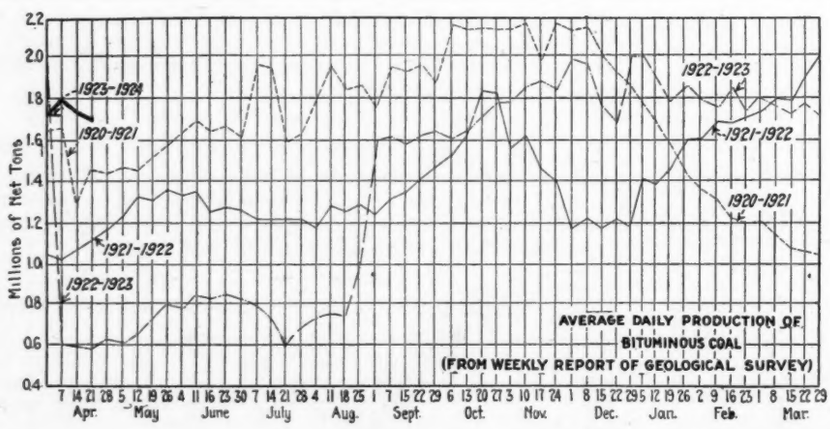
Export Market Quietly Expanding

The export market is quietly developing. France placed an order for high-volatile coal for delivery through the summer at $3.35 per net ton. Baltimore has been experiencing a revival in foreign coal trade, 174,283 tons of cargo and bunker having been loaded out in the first three weeks of April.

Final estimates of soft-coal production during the coal year 1922-1923 place the total at 418,734,000 net tons, according to the Geological Survey. This is a decrease of 21,783,000 net tons as compared with 1921-1922 and 115,006,000 net tons under the production of 1920-1921.

"The total soft coal raised in the week April 9-14," says the Geological Survey report, "including coal coked, local sales, and mine fuel, is estimated at 10,393,000 net tons, which is 764,000 tons more than in the short week preceding but is a slight decrease as compared with the week ended March 31. Preliminary reports of cars loaded in the week April 16-21 indicate decrease to between 10,000,000 and 10,200,000 tons."

Demand for anthracite domestic sizes continues brisk. Retail dealers are filling consumers' orders as rapidly



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
March 31	10,469,000	10,430,000
April 7 (b)	3,835,000	9,629,000
April 14 (a)	3,656,000	10,393,000
Daily average	609,000	1,732,000
Calendar year	136,779,000	159,164,000
Daily av. cal. year	1,545,000	1,794,000
ANTHRACITE		
March 31	1,896,000	2,008,000
April 7	9,000	1,602,000
April 14	6,000	2,067,000
Calendar year	21,792,000	29,537,000
COKE		
April 7 (b)	175,000	428,000
April 14 (a)	140,000	420,000
Calendar year	2,123,000	5,557,000

(a) Subject to revision. (b) Revised from last report.

as they receive the coal and have not started to fill their yard bins. Steam sizes are beginning to accumulate, it being reported that some producers are sending part of their tonnage to storage. Production during the week ended April 14 is estimated at 2,067,000 net tons.

Most Midwest Trade Drags

The Midwest market for almost all coals is spongy indeed. Good domestic has been selling fairly well because of continued cold weather but spring appears to have come at last and even this trade is threatening to disappear for awhile until stocking business starts. Practically every middle- and small-size coal is in trouble. Southern Illinois screenings in Chicago have slumped under $2, central Illinois is suffering at $1.60 and there is no price at all on Standard district output. Indiana Fourth Vein is carried along by the fluctuations of southern Illinois. It is confidently expected that when domestic demand grows even softer within a week or two, steam sizes naturally will rescue themselves from these abnormal depths.

Household trade in anthracite and smokeless is fair, for there are a few far-sighted consumers in this region. Stove and furnace sizes of hard coal are offered by retailers at $15.50 and $16 now and Pocahontas mine-run at $9. A little easing up of rail congestion on coal from the East might drop these prices a shade but not much, for the opening of Lake traffic is expected to take enough cars out of long-haul service to make smokeless and Pennsylvania coals hard to get here.

St. Louis Does Little But Railway Business

Warm weather around St. Louis has practically stopped the spontaneous buying of cheap coal in small lots. Some coal is going into storage, however, because of price, which is $2 a ton less than it was thirty days ago. Mt. Olive deliveries are practically nothing, and Standard coal is moving slowly for domestic uses. Wagon-load steam has been good but carload steam shows a slowing up. Anthracite movement is fair. Coke and smokeless are dragging.

Railroad tonnage through this gateway has been easy for some time past. A little coal moves to the Northwest and some to Chicago.

West Kentucky Market Is Fair

Demand for western Kentucky coal while not heavy is fair, and prices are well maintained. Screenings are a little firmer and quotations for May delivery higher. Car

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

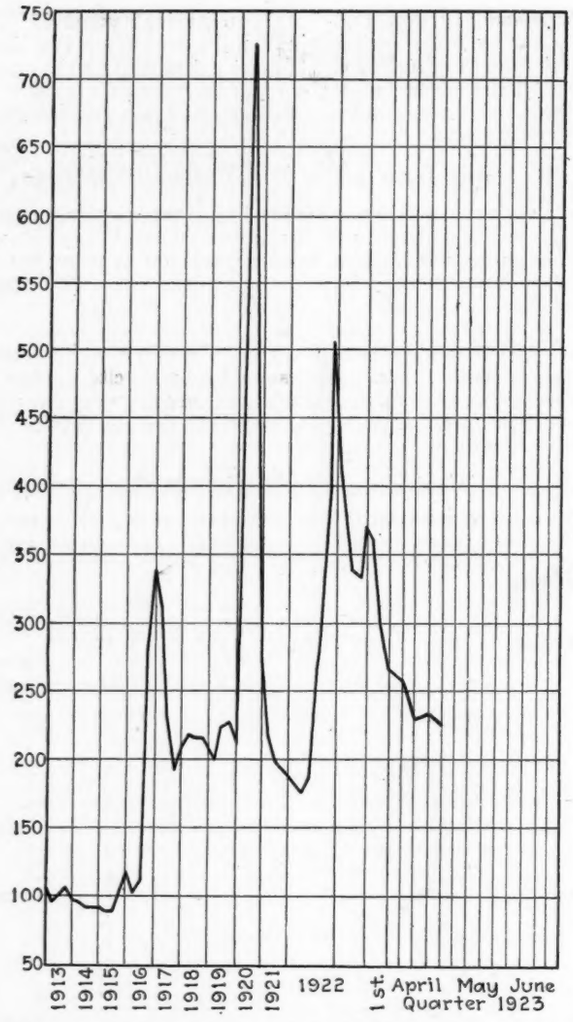
Low-Volatile, Eastern	Market Quoted	Apr. 24 1922	Apr. 9 1923	Apr. 16 1923	Apr. 23 1923†
Smokeless lump	Columbus	$2.85	$6.25	$6.10	**$6.00@$6.35**
Smokeless mine run	Columbus	2.00	4.25	4.25	4.00@ 4.50
Smokeless screenings	Columbus	1.55	3.75	4.00	**3.75@ 4.50**
Smokeless lump	Chicago	2.30	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	1.80	3.75	3.75	**3.75@ 4.00**
Smokeless lump	Cincinnati	2.65	6.00	6.35	6.25@ 6.50
Smokeless mine run	Cincinnati	2.00	3.85	4.25	4.00@ 4.50
Smokeless screenings	Cincinnati	1.90	3.85	4.10	*3.75@ 4.25*
*Smokeless mine run	Boston	4.80	6.25	6.30	*6.00@ 6.50*
Clearfield mine run	Boston	2.70	2.90	2.95	*2.25@ 3.25*
Cambria mine run	Boston	3.25	3.75	3.65	*3.00@ 3.75*
Somerset mine run	Boston	2.70	3.35	3.35	*2.85@ 3.50*
Pool 1 (Navy Standard)	New York	3.65	4.00	4.00	*3.50@ 4.25*
Pool 1 (Navy Standard)	Philadelphia	3.45	4.10	4.00	*3.80@ 4.15*
Pool 1 (Navy Standard)	Baltimore	3.75	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.25	3.35	3.25	*2.75@ 3.50*
Pool 9 (Super. Low Vol.)	Philadelphia	3.05	3.30	3.25	*3.00@ 3.45*
Pool 9 (Super. Low Vol.)	Baltimore	3.25	3.25	3.25	*2.90*
Pool 10 (H.Gr.Low Vol.)	New York	3.00	2.85	2.65	*2.25@ 2.75*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.90	2.80	2.65	*2.40@ 2.75*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.95	2.90	2.90	*2.50*
Pool 11 (Low Vol.)	New York	2.75	2.50	2.30	*1.85@ 2.25*
Pool 11 (Low Vol.)	Philadelphia	2.70	2.40	2.25	.....
Pool 11 (Low Vol.)	Baltimore	2.85	2.25	2.25	*2.15*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	2.50	2.30	2.05	*1.65@ 2.10*
Pool 54-64 (Gas and St.)	Philadelphia	.....	.....	2.20	*2.10@ 2.35*
Pool 54-64 (Gas and St.)	Baltimore	.....	2.25	2.25	*1.95*
Pittsburgh sc'd gas	Pittsburgh	.....	3.00	3.10	3.00@ 3.25
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	2.00	2.15	*2.00@ 2.25*
Kanawha lump	Columbus	2.45	4.00	3.75	3.50@ 4.00
Kanawha mine run	Columbus	2.15	2.50	2.25	2.00@ 2.50
Kanawha screenings	Columbus	1.70	2.35	2.30	**2.25@ 2.55**
W. Va. lump	Cincinnati	2.65	3.60	3.50	**3.25@ 4.50**
W. Va. Gas mine run	Cincinnati	2.40	2.60	2.35	**2.25@ 2.75**
W. Va. Steam mine run	Cincinnati	1.95	2.35	2.35	**2.25@ 2.75**
W. Va. screenings	Cincinnati	1.90	2.35	2.15	**2.00@ 2.50**
Hocking lump	Columbus	2.65	3.00	3.00	*2.75@ 3.00*
Hocking mine run	Columbus	2.15	2.10	2.10	*1.85@ 2.20*
Hocking screenings	Columbus	1.75	1.75	1.60	**1.60@ 1.85**
Pitts. No. 8 lump	Cleveland	3.40	2.90	3.00	*2.35@ 3.50*
Pitts. No. 8 mine run	Cleveland	$2.55	$2.20	$2.25	*$2.10@$2.25*
Pitts. No. 8 screenings	Cleveland	2.55	2.00	1.95	1.80@ 2.10
Midwest					
Franklin, Ill. lump	Chicago	3.45	3.85	3.85	*3.50@ 3.85*
Franklin, Ill. mine run	Chicago	2.75	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	2.75	2.05	1.95	1.90@ 2.00
Central, Ill. lump	Chicago	2.65	2.75	2.75	*2.65@ 2.75*
Central, Ill. mine run	Chicago	2.65	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	1.85	1.60	1.55	1.50@ 1.65
Ind. 4th Vein lump	Chicago	3.15	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	2.50	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.25	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	2.60	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	2.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.40	1.55	1.55	1.50@ 1.60
Standard lump	St. Louis	.....	2.50	2.50	2.50
Standard mine run	St. Louis	.....	1.85	1.85	1.75@ 2.00
Standard screenings	St. Louis	.....	1.10	1.10	1.10
West Ky. lump	Louisville	2.20	2.50	2.50	2.25@ 2.75
West Ky. mine run	Louisville	2.00	1.85	2.10	2.00@ 2.25
West Ky. screenings	Louisville	2.25	1.75	2.00	*1.75@ 2.10*
West Ky. lump	Chicago	.....	2.85	2.60	2.50@ 2.75
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.50	2.50	2.50
Big Seam mine run	Birmingham	1.70	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	3.85	3.85	**3.75@ 4.25**
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.40	4.00	3.85	3.50@ 4.25
S. E. Ky. mine run	Louisville	2.40	2.80	2.75	*2.50@ 2.75*
S. E. Ky. screenings	Louisville	1.70	2.50	2.45	*2.15@ 2.25*
S. E. Ky. lump	Cincinnati	2.40	3.50	3.50	**3.75@ 4.25**
S. E. Ky. mine run	Cincinnati	2.00	2.50	2.25	2.00@ 2.50
S. E. Ky. screenings	Cincinnati	1.65	2.35	2.15	*1.75@ 2.50*
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.00	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.50	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	April 16, 1923 Independent	April 16, 1923 Company	April 23, 1923† Independent	April 23, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@10.50	8.00@ 8.35	$8.50@10.50	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@10.50	8.00@ 8.35	8.50@10.50	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@10.50	8.00@ 8.35	8.50@10.50	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.50	6.00@ 6.30	6.30@ 7.50	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.50@ 3.50	3.50@ 4.15	*2.25@ 3.50*	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.50	3.50	*3.00@ 3.50*	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.50	2.50	*2.00@ 2.50*	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	*1.00@ 1.50*	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50	1.50	*1.15@ 1.50*	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*



Coal Age Index 231, Week of April 23, 1923. Average spot price for same period $2.79. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

supply is 99 per cent on the Illinois Central, 60 per cent on the Henderson division of the Louisville & Nashville, and 37 per cent on the Owensboro division. Much new equipment and many mechanical coal loaders are going into this field to help meet Eastern competition.

Louisville Trade Is Awake

In Louisville trade is fair considering the facts that Lake movement hasn't opened much and that retail demand is slowing down. Prices are much higher than they were at this time last year. There is good demand from utilities, railroads scattered industries, steel and metal working plants and building-material producers. The brick and cement interests were never busier than they are now. Gas coal is in fair demand, as byproduct companies are busier and gas companies have worked down their stocks and are in the market again. River movement is awakening.

The price situation is practically at a deadlock. Operators assert that they are down to bedrock as a result of high union scales, and the fact that they are restricted to three days a week or less by car shortage and slow market.

Northwest in Lull Preceding Lake Season

The quiet before the storm would be an apt characterization of the market at the Head-of-the-Lakes at present. The market has dropped off with the advent of temperature above the freezing mark and everyone seems to be waiting to see which way the cat will jump after the opening of navigation. There are not more than 600,000 tons of bituminous coal on the docks now. Anthracite is exhausted, of course, and has begun to come in by rail to meet special needs. Hard coal by Lake is expected to start at $2 under last year.

Prices are firm. Screenings, of which there is a large amount, sell at $4.75, lump at $8.50 and run of pile at $7.50. Pocahontas mine-run is quoted at $8.75 and screenings, mostly dust, at $7. There is a fair supply of coke and briquets, the former at $12 and the latter at $10.50.

Some Kentucky coal, traveling all rail, has reached the Duluth market and is competing. The differential in freight rates makes this possible.

Extreme dullness prevails in Milwaukee coal circles. Cheaper coal is expected when navigation opens. There is a steady influx of anthracite and soft coal by rail and car ferry, but not any more than enough to keep dealers supplied promptly. Prices continue unchanged. A revision of prices probably will be forthcoming May 1. Coke is due for a substantial drop.

Western Business Is Light to "Rotten!"

In Kansas City and the region supplied by the Kansas, Oklahoma and Arkansas coal fields coal trade for the past week has been light but some coal has been moving most of the time from operating mines because the number of mines constantly dwindles and retail prices are dropping. Governor Davis' investigation to determine whether the shutdowns are necessary or just for fun is still going on.

Coal business in Utah is described feelingly as "Rotten!" Mines are working less than two days a week. There is no contracting and dealers report domestic consumption at a low ebb. There is no business from the Coast. As a result of the low production the slack market is tightening up. Smelters are using more of this grade than they did, but in most cases they have large stocks on hand.

Columbus Market Develops Strength

Slightly more strength has developed in the Columbus market due to the falling off in supplies as a result of the closing down of mines and reduced car supply. Contracting for steam tonnage shows more activity. Buyers are showing some anxiety as to future stocks and are placing contracts around $2.35@$2.50 for mine-run. Railroad, municipal and school contracting is going on to some extent.

In the Cincinnati market more talk of quality coals was heard and coals with established reputations brought good money. Better grades of steam coals are in better demand because large buyers believe that at current prices this coal is a good "buy." The Cleveland market is dull. Buyers want to contract at current prices while sellers are not disposed to tie up their output at such figures as now prevail.

Mines in Pittsburgh District Close

There is a continuance of the tendency in the Pittsburgh district to close mines particularly dependent on the spot market for an outlet, as that market has meant a loss for several weeks. The market is suffering from the failure of the Lake market to open extensively. Both industrial and railroad consumption of coal is excellent, while the steel industry continues its best showing for steady and sustained production.

Some of the shippers in the Buffalo market say buying continues to fall off.

New England Price Tendency Higher This Year

The only developments of the week in New England disclose a purpose on the part of producers to maintain a higher level of prices than prevailed during 1922. Recent bids for Navy supply, particularly at Hampton Roads, have been closely analyzed by the trade, and the basis is practically a dollar a ton more than quotations were being made a year ago.

At Hampton Roads accumulations continue to about the same extent as for a month past, but quotations are not enough easier to justify predictions of a soft market later on. The agencies are proceeding on a month-to-month

basis as to price, and, for the present, notwithstanding the Navy bids, buyer and seller are not likely to agree on a season base price. For distribution inland from Boston, Providence and Portland $8.25 per gross ton on cars is about the current figure. There are still delays at railroad berths, but they are by no means as serious as during March.

Buying is cautious and there are few intimations of any comprehensive purchases the next fortnight or so. Railroads have made purchases but along much restricted lines, and to the trade it was no surprise to see a large order placed in the usual channels. Less is heard from Scotch and Welsh high volatiles, and arrivals from British ports are likely to be few and far between during the balance of the season.

Sales agents for coals in the Pennsylvania districts are under more and more pressure to get business either spot or contract, and in consequence prices have reached a low ebb. It is nothing unusual now to have fair grades of Clearfield offered at around $2.25 per net ton at the mines, with better grades running up to $3 and $3.25. The really choice coals are still in position to command $3.25@$4 but most of these are specialties, and in some cases operators are finding it difficult to move current output. A small tonnage found its way to shoal points along the cost, where freight rates from Philadelphia as compared with Hampton Roads are slightly in favor of Philadelphia loading, but in the aggregate the tonnage was not large and not especially significant.

For the bulk of their market Pennsylvania operators must still look to the all-rail route, as far as New England is concerned, and if Pocahontas and New River are to be maintained a dollar or so above last year it is quite possible there will be an enlarged outlet for the better grades from Pennsylvania later in the season. It was the $6 or less price on cars at Boston a year ago that put all-rail coals into the discard for large sections of this territory.

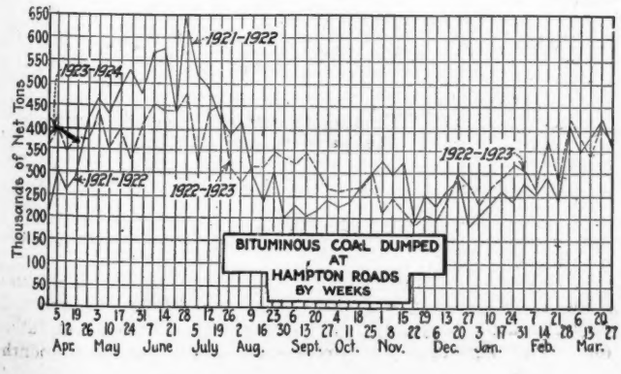
New York Dealers See Bottom of Market

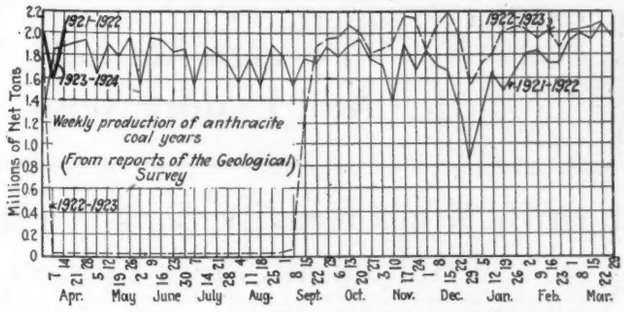
Some dealers in the New York market believe the bottom has been reached in prices and while demand continued slow last week there were numerous inquiries. It is said that a few large consumers had made heavy purchases. Philadelphia buyers on the other hand, do not seem to think the bottom has yet been reached. There is a general intention on their part to stock up when they consider the low point has been reached. The soft-coal market at Baltimore was soft, the export movement being the feature of the situation.

Steam Inquiry at Birmingham Disappoints

Inquiry for steam coal at Birmingham, Ala., was not as brisk as was desired. Railroads which use upward of one-third of the total annual production of the field are preparing to negotiate new contracts.

While there has been some buying for Lake shipment, the market has not opened extensively. Heavy ice is reported from various points and unhampered traffic is not expected until the end of the first week in May. During the week ended April 23 soft coal dumped at Lake Erie piers totaled 236,611 tons of cargo coal and 9,791 tons of fuel coal, making a total of 640,118 tons of cargo coal and 26,897 tons of fuel coal dumped this month.


Thousands of Net Tons
1921-1922
1923-1924
1922-1923
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.


Millions of Net Tons
1921-1922
1922-1923
1923-1924
Weekly production of anthracite coal years
(From reports of the Geological Survey)
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.

Domestic Anthracite Active; Steam Dull

The demand for domestic sizes of anthracite is active. Retail dealers books are filled with orders. Steam sizes are causing some trouble because of the lack of demand.

"Production of anthracite recovered promptly from the depression due to holidays and again passed the 2,000,000-ton mark," says the Geological Survey. "The total output in the week ended April 14, including mine fuel, dredge and washery coal, and sales to the local trade, is estimated at 2,067,000 net tons. This was an increase of 465,000 tons over production in the holiday week preceding and was 59,000 tons more than the output in the week ended March 31. The cumulative output during the present calendar year to date stands at 29,537,000 tons, an increase of 7,745,000 tons, or 36 per cent, over the corresponding period in 1922."

Beehive Coke Output Declines Slightly

"The production of beehive coke declined slightly during the second week of April," the Geological Survey reports. "Using as a basis the number of cars loaded by the principal coke carriers the total output was estimated at 420,000 net tons, against 428,000 tons in the week preceding. The decrease was general except in West Virginia, where there was an increase of approximately 3,000 tons."

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Apr. 7, 1923 Inclusive	Week Ended Apr. 7, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	30.0	58.2
Panhandle, W. Va.	51.3	57.3	55.6	59.4
Westmoreland	58.8	65.8	54.5	64.9
Virginia	59.9	55.7	54.4	50.8
Harlan	54.8	22.1	22.7	28.1
Hazard	58.4	16.4	21.5	29.0
Pocahontas	60.0	36.6	37.7	34.9
Tug River	63.7	28.8	34.3	28.4
Logan	61.1	26.2	31.0	29.1
Cumberland-Piedmont	50.6	31.7	47.1	53.0
Winding Gulf	64.3	30.4	34.1	35.9
Kenova-Thacker	54.3	42.4	34.2	50.0
N. E. Kentucky	47.7	28.4	28.2	(a)
New River	37.9	31.6	36.0	40.7
Oklahoma	59.6	59.1	43.0	27.4
Iowa	78.4	75.9	80.4	84.4
Ohio, Eastern	46.6	40.8	35.2	40.8
Missouri	66.8	76.3	77.3	67.3
Illinois	54.5	49.9	47.7	40.8
Kansas	54.9	55.9	48.1	51.7
Indiana	53.8	37.7	52.1	44.4
Pittsburgh†	39.8	41.2	33.8	41.7
Central Pennsylvania	50.2	53.4	46.3	56.9
Fairmont	44.0	35.5	34.1	46.8
Western Kentucky	37.7	32.4	32.7	(a)
Pittsburgh*	31.9	56.1	58.9	55.7
Kanawha	13.0	15.6	23.1	28.8
Ohio, Southern	24.3	38.1	32.6	33.8

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended April 7, 1923	895,767	164,089
Previous week	938,725	182,668
Same week in 1922	706,013	69,106

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	Car Shortage
April 4, 1923	15,168	4,305	58,237	24,539
Same date in 1922	259,605	122,359	.....	.....
March 28, 1923	14,196	3,785	68,986	29,281

Foreign Market And Export News

British Mines Heavily Booked with Orders—Production Shows Further Cut

Output of Great Britain's coal mines during the week ended April 7 was 3,940,000 tons, says a cable to *Coal Age*. This is a decrease of 934,000 tons, when compared with the production of the previous week which was 4,874,000 tons. The week of April 7 included a national holiday, Easter Monday. The cutting of production made the scarcity of Welsh coal more pronounced.

About 46,000 men, or one-fifth of the men employed in the Welsh coal fields were involved in the recent strike, the object of which was to force the surface men, who have their own union, into the Miners' Federation. The men are now back at work, and the surface men continue to be independent of the Federation.

Over one-half of the present Welsh exports are going to France and Italy, but the exports to South America, coaling depots, the Far East, Belgium, and Germany are on a satisfactory scale.

Mines are booked with orders to the limit of their capacity. It is believed that if increased supplies were available the export coal trade would now be able to surpass the high level attained in former record years. Scarcity of supplies, however, acts as a deterrent to further export expansion. Mines in the Newcastle district are sold up well into **May.**

Coal exports officially reported from London for the weeks ended April 13 and April 20, in tons, follows:

	April 13	April 20
South Wales district	.....	2,647
Newcastle (Tyne) district	1,140	1,020
Clyde	4,700	.....

French Mine Strike Settled

The strike that was in progress in the Lorraine coal fields for several weeks was settled early this month, work being entirely resumed in the mines on April 6. The settlement it was hoped would hasten similar action in the Saar region where the workers have been on strike for some time.

Demand for industrial coals continues heavy and consumers' supplies are low. The transportation difficulties which were mostly due to congestion at French sea ports owing to heavy imports of British coals have been much relieved. In the Loire and Center coal fields, the shortage of coals is none the less acute than in the north of France, and small collieries which usually have difficulty in selling their product are sold up.

The following bids for supplying coal to the Prefecture de la Seine have recently been accepted:

Eighteen thousand four hundred tons of half-fat run-of-mine, tendered by the Cie des Mines d'Aniche at 102 fr. 50 f.o.b. mines;

Ten thousand tons of anthracite (lean) cobbles, tendered by the Cie des Mines d'Anzin at 148 fr. f.o.b. mines.

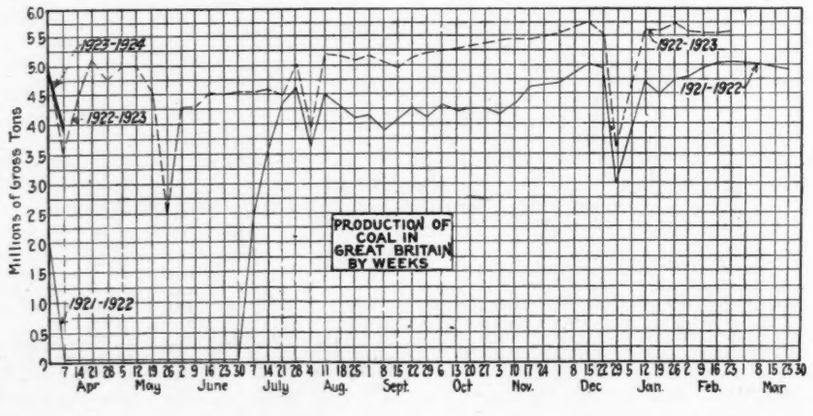
Shipments of coke amounting to about 2,700 tons were made daily to France from the Ruhr toward the end of the first week in April. It was expected that this tonnage would gradually increase.

Business at Hampton Roads Brisk

Business was brisk at Hampton Roads last week, with prices stronger and inquiries and demand on the upgrade. Export business fell off but bunkers held good and coastwise shipments were fair.

Accumulations at the piers increased, as a result of an improvement in the car situation, which was about 60 to 70 per cent of normal. The demand, however, was sufficient to guarantee against demurrage.

Domestic dealers watched their business drop, because of the advent of summer, but were devoting their energies to launching the summer's ice business. The general tone of the market was firm, and the outlook for a good business during the spring and summer was favorable. Shipments to France continue in small quantities, with prospect of increasing.



Saar Production, 1922

During 1922 the Saar collieries produced 11,240,000 tons of coal and 253,120 tons of coke. The coal produced was distributed as follows:

	Tons
Mines' consumption (with annexed works)	813,837
Supplies to mine workers	347,762
Delivered to coke ovens	317,702
Shipments on sales	10,207,773
Total	11,687,074
Less: decrease of stocks during the year	447,071
Output	11,240,003

Export Clearances, Week Ended April 14, 1923

FROM HAMPTON ROADS

	Tons
For Brazil:	
Braz. SS. Iguassu, for Rio de Janeiro	4,989
For Cuba:	
Nor. Christian Michelson, for Havana	5,321
Dan. SS. Phonix, for Havana	2,725
For France:	
Br. SS. Mongolian Prince, for Havre	8,713
For Italy:	
Ital. SS. Valdarno, for Porto Ferrajo	6,967
For Porto Rico:	
Amer. Schr. Herbert L. Rawding, for Manati	1,500
For West Indies:	
Nor. SS. Kjellbergen, for Curacao	2,778

FROM PHILADELPHIA

For Belgium:	
Br. SS. Glenluss, for Antwerp (coke)	...
Nor. SS. Gro, for Antwerp (coke)	2,589
Belg. SS. Caucasier, for Antwerp (coke)	...
Br. SS. Chalister, for Antwerp (coke)	...
For Cuba:	
Dan. SS. Niels R. Finsen, for Havana	...
For France:	
Br. SS. Whateley Hall, for Dunkirk (coke)	...
Belg. SS. Brazilier, for Dunkirk (coke)	...
For Germany:	
Ital. SS. Piave, for Hamburg	...
Br. SS. Galtymore, for Hamburg (coke)	...

Hampton Roads Pier Situation

N. & W. piers—Lamberts Pt.:	April 12	April 19
Cars on hand	1,530	1,191
Tons on hand	99,747	77,981
Tons dumped for week	138,901	136,941
Tonnage waiting	30,000	5,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,646	1,743
Tons on hand	94,940	98,950
Tons dumped for week	94,582	126,114
Tonnage waiting	2,312	17,619
C. & O. piers, Newport News:		
Cars on hand	2,570	2,603
Tons on hand	135,335	136,315
Tons dumped for week	118,168	74,033
Tonnage waiting	1,050	9,250

Pier and Bunker Prices, Gross Tons

PIERS

	April 14	April 21†
Pool 9, New York	$6.25@$6.65	*$6.00@$6.35*
Pool 10, New York	5.50@ 6.00	*5.40@ 5.75*
Pool 11, New York	4.50@ 5.50	*4.50@ 5.00*
Pool 9, Philadelphia	6.35@ 6.80	*6.30@ 6.75*
Pool 10, Philadelphia	5.45@ 5.85	*5.40@ 5.80*
Pool 11, Philadelphia	4.50@ 4.90	*4.40@ 4.80*
Pool 1, Hamp. Roads	6.00@ 6.25	**6.25@ 6.50**
Pools 5-6-7 Hamp. Rds.	5.50	*5.25*
Pool 2, Hamp. Roads	6.00@ 6.25	**6.25@ 6.50**

BUNKERS

Pool 9, New York	6.55@ 6.95	*6.30@ 6.65*
Pool 10, New York	5.80@ 6.30	*5.70@ 6.05*
Pool 11, New York	4.80@ 5.80	*4.80@ 5.30*
Pool 9, Philadelphia	6.65@ 6.90	*6.60@ 6.85*
Pool 10, Philadelhia	5.70@ 6.25	*5.65@ 6.20*
Pool 11, Philadelphia	4.75@ 5.20	*4.70@ 5.15*
Pool 1, Hamp. Roads	6.25	**6.50**
Pool 2, Hamp. Roads	6.25	**6.50**

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	April 14	April 21†
Admiralty, large	40s.	**40s.@ 45s.**
Steam, smalls	30s.	**30s.@ 32s.6d.**
Newcastle:		
Best steams	35s.	*34s.6d.@35s.*
Best gas	33s.@35s.	*32s.6d.@35s.*
Best bunkers	32s.6d.@35s.	**35s.**

†Advances over previous week shown in **heavy type**; declines in *italics*.

News Items From Field and Trade

ALABAMA

At a recent meeting of the stockholders of the **Burnwell Coal Mining Co., the capital stock was increased from $200,000 to $250,000.** The company operates commercial mines in Walker County, with principal offices in Birmingham.

The Porter Coal Co. has been incorporated with a capital stock of $10,000 and will take over the operation of the Porter Mine in Walker County, near Palos. K. E. Cooper, Sumner E. Thomas and Brewer Dixon, of Birmingham, are the incorporators, Mr. Cooper being president of the company.

The Alabama Company will soon be producing coal from its No. 2 mine at Lewisburg, Ala. This mine has been developed for several years but has not been operated for some time, but due to the company's pressing need for coal it has been decided to place the mine in operation.

J. J. Forbes, mining engineer in charge of the Birmingham station of the Bureau of Mines, **has been detailed with the U. S. Coal Commission to collect data** on coal losses in mines in the southern district. Dr. F. B. Meriwether, surgeon, Bureau of Mines, also is in the district assembling data on camp sanitation for the use of the Coal Commission.

ALASKA

So as to make more available the coal resources of the Moose Creek field, the Alaskan Engineering Commission has cabled the Secretary of the Interior, recommending the **immediate construction of a spur into the Moose Creek field.** W. P. T. Hill, of the Bureau of Mines' staff, who has been studying the situation in this coal field, reports that development has reached a point where the building of this spur is justified by the prospective tonnage.

COLORADO

Judge T. Blake Kennedy, of the U. S. District Court at Denver, on April 6, **issued a temporary injunction setting forth in detail the policy to be adopted by the Denver & Salt Lake R.R. in allocating cars to coal mines.** The injunction was issued on the application of the Interstate Commerce Commission in proceedings instituted on behalf of several other coal mines on the route which alleged that in assigning cars to the mines the railroad company had not taken into consideration those cars supplied to mines for the transportation of coal destined for the use of the railroad itself.

ILLINOIS

The No. 4 mine of the **Gartside Coal Co.,** at Murphysboro; the **Tilden mine** of the **Madison Coal Corporation** and the mine operated by the **Union Fuel Co. at Auburn** have been temporarily closed.

Pumps have been started at **the mine of the Kanawha Fuel Co. at Duquoin.** While no reports have been given out, **it is generally supposed that the mine is to be opened soon** either by the owners or under lease by another concern. The mine has been operated until about a year and a half ago by the Old Abe Mining Co., which is controlled by the same officials as the Kanawha Fuel Co., of Milwaukee, Wis. If the mine is opened much new machinery and equipment will have to be installed to take the place of that removed or destroyed by water since the plant was shut down.

The Coal Operators' Association of the Fifth and Ninth Districts of Illinois, including the operators of 99 mines in southern Illinois adjacent to St. Louis, has decided to **protest against the passage of a bill** pending before the Legislature **which provides for a tax of 8c. a ton on coal** as it comes from the mine. The tax, if placed, would be an additional cost to the consumer and besides would handicap the industry in Illinois in competition with other coal fields, according to Dr. C. H. Krause, president of the association and vice-president of the Willis Coal & Mining Co. The association will also oppose a bill which will put the regulation of the coal mines under the jurisdiction of the Commerce Commission.

The mines of the **Superior Coal Co. broke all its own weekly** records in the last week of March when the four mines hoisted a total of 117,242 tons of coal for the six days. Thursday of that week the four mines hoisted 20,191 tons of coal, the greatest tonnage ever hoisted in a day of eight hours by the four mines. The average daily hoist for the week was 19,540 tons. On Thursday, March 22, mine No. 2 broke its old record for tonnage and also established a new company record for mine cars hoisted in eight hours, by hoisting 1,648 mine cars with a tonnage of 5,625. T. T. Ferguson is the manager of the mine and William Harlow and Emil Viehweg are the engineers who made the hoist, working alternately one hour apiece.

On Thursday, April 12, **No. 6 mine of the Peabody Coal Co. made a record hoist** of 2,830 tons with a time loss of 23 minutes. The previous record at this mine was made on Feb. 24, 1919, when the tonnage raised was 2,667. The mine is in charge of P. W. MacMurdo, superintendent, and Owen Melkush, manager.

The following **mines in the Belleville district have been temporarily closed:** Columbia Colliery Co., Famous Mine at Freeburg and Royal Mine, Belleville; Star Coal Co. at Freeburg; B. & B. Coal Co. at Belleville; Signal Hill Coal Co. at Belleville; Summitt Coal Co., at Belleville; Fullerton Coal Co., at Belleville. Other mines closed recently are the Consolidated Coal Co.'s West mine at Breese and two mines operated by the O'Gara Coal Co. in Saline County.

There are two coal companies prospecting in Fulton County, one of which, the **Tiger Coal Co., is laying a switch** for a strip proposition.

The Colonial Collieries Co., 38 South Dearborn Street, Chicago, has incorporated with a capital stock of $500,000. Incorporators are Thomas J. Mylet, Edward G. Sternberg and Herbert Lanigan. The purpose is to mine, transport and sell coal.

F. W. J. Sextro, formerly officer and director of Rutledge & Taylor Coal Co. and Security Coal & Mining Co., **has acquired the Paramount Fuel Co.,** Chicago. Effective at once, Mr. Sextro will be actively associated with this company at 607 Fisher Building.

Charles C. Fitzmorris, recently Chief of Police of Chicago, who retired with the Thompson administration at the last election, **has been made president of the Eureka Coal & Dock Co. of Chicago.**

Paul Weir, for the past two years chief engineer of the Bell & Zoller Mining Co. properties at Zeigler, has just been appointed to the position of general superintendent over the same property. The promotion was a surprise to all, including Mr. Weir himself.

INDIANA

The Conveyors Corporation of America, Chicago, announces the appointment of **Irvin C. De Haven Engineering Corporation,** State Life Building, Indianapolis, as district representative. The new agency will handle the sale of the American steam jet ash conveyor in Indianapolis and surrounding territory.

Indiana miners will pay the lowest price for their powder for the next year of any district in the country and will save approximately $80,000 during that period, as a result of a contract signed by committees from the Indiana Bituminous Coal Operators' Association and United Mine Workers. Last year's price of $2.10 a keg is reduced to $2. According to the Terre Haute agreement, the coal operators of this state are to furnish black powder to the miner at cost, plus the expense of handling, transportation and insurance. These expenses were fixed at 25c. a keg and a reduction in the cost of the black powder from $1.85 to $1.75 brought the reduction in the price to miner. The contract dates from April 1, 1923, to April 1, 1924.

The Akin-Burton Coal Co., of Terre Haute, has incorporated to produce and sell coal. Charles T. Akin, Sedgwick R. Akin and Charles E. Burton are the incorporators. The capital stock is $50,000.

Retail coal prices in Indianapolis have declined about $1.50 a ton on all grades the last few weeks, a survey of prices shows. Summer schedules usually are issued after the middle of April, and a further decline is expected when these schedules are fixed. Pocahontas lump, which hit the high mark of $13 to $13.25 a ton in the winter, can be bought now at prices generally ranging from $11 to $11.50 a ton, though some firms are charging $12. Indiana fourth vein lump is quoted as low as $5.95 a ton. In the winter it was as high as $7.50 to $8. West Virginia and Kentucky domestic sizes are $9 to $10 a ton, a decline of about $1.50. The break in prices began about three weeks ago.

Work in the Atlas mines, at Petersburg, has been resumed following a brief strike of the machine operators which was settled by arbitration. The machine operators complained that the scale paid did not recompense them for cutting entries in the mine, as the Atlas mine is driving entries only during the summer months and the machine operators cannot make as much as they did formerly by cutting coal in rooms in which it is not necessary to move their machines so often. The Howe Coulter Coal Co., operating the Atlas mines, and **the union reached an agreement** whereby the coal company will be enabled to drive entries all summer and when the coal business is resumed next autumn 750 men can be placed in the mine, instead of the 500 now employed. Coal mines in Pike County are operating less than 40 per cent. Only the stripping mines are operating full time.

KANSAS

Governor Davis has been asked by the district miners' union at Pittsburg, **to require the Jackson-Walker Coal & Mining Co. to resume operations** at its No. 16 mine. It was asserted by the officials of the company that the mine had been shut down since March 28 because of inactive market

KENTUCKY

General offices for the development of the new Henry Ford properties in Kentucky will be at Stone, nine miles north of Williamson, in Pike County, on the Kentucky-West Virginia border. Stone has a population of 503 persons. This announcement was received by the Lexington Board of Commerce, which had been endeavoring to have the state offices located at Lexington.

The Elkhorn Coleman Coal Co., whose mine at Millard, Pike County, on the C. & O. Ry., was closed in May, 1921, reopened that operation in December last.

Elkhorn Marrowbone Coal Co., of Wolfpit, Pike County, on the C. & O. Ry., reopened their mine at that place in November last after being closed since May, 1921.

A report from Whitesburg, is to the effect that the **Consolidated Fuel Co.,** Pittsburgh, Pa., operating at Dalna, **has bought a large coal land acreage** near Livingston, in Rockcastle County, and is planning development.

The United Mine Workers, in a legal battle to collect $32,000 from the Mahan Jellico Coal Co. for alleged violation of contract, appealed April 18 at Frankfort from a decision of the Whitely Circuit Court that declared the wage agreement invalid. The miners contend that they signed in April, 1920, and that the company, after trying to get them to give up their union charter, closed the mine down in December, 1921, and refused to pay the miners the $2 a day provided in the agreement in case the mines were closed on account of any dispute and the company either failed to appear before an arbitration board or to abide by such a board's decision.

Terminal improvements under way or planned **in Louisville** for increasing car handling facilities of local yards **will cost about $8,000,000.** The Kentucky & Indiana Terminal R.R. has placed orders for several additional switch engines and has announced plans for a large increase in trackage. The C.C.C. & St.L. is planning to double track the Big Four bridge at Louisville. The Louisville & Nashville is building additional yards south of the city. Contracts for heavy car repairs have been placed in outside shops by some of the roads that operate into Louisville.

Tapping the water supply of a coal mining company after the city reservoir was exhausted **saved the coal mining town of Clay** in the western field from destruction on April 5. Six buildings were destroyed and others damaged, the loss being about $100,000.

The Burclut Coal Co., of Middlesboro, capital $30,000, has been chartered by John W. Burnett, W. L. Burnett and George A. Clutts.

R. M. Watt, district manager for the Kentucky Utilities Co., at Pineville, recently obtained an option on well-located property as a site for a new $1,500,000 power plant.

The Reams Hardware Co., of Middlesboro, has taken over the mine supply business of Rogan Brothers Co., a branch of the Kentucky Mine Supply Co.

MASSACHUSETTS

Allan M. Macleod has been appointed New England representative of Dickson & Eddy, of New York City, effective May 1. He will have offices at 60 Congress Street, Boston, and will look after the interest of the company in that territory, including the development of its bituminous-coal business. Mr. Macleod is well known in the coal trade, having been associated with it since Dec. 1, 1904. In January, 1915, he became connected with the Northern Coal Co., remaining with that concern until Nov. 1,

ALLAN M. MACLEOD

1917, when he joined the Fuel Administration at Washington, becoming manager of the Zone Coal Permit Bureau when it was formed. In May, 1918, he became director of anthracite distribution under James J. Storrow, New England Fuel Administrator in Boston. During the 1919 coal strike he served as a member of the New England Sub-Committee of the Eastern Regional Coal Committee. In February of 1920 Mr. Macleod became associated with C. H. Sprague & Son Co., and as a representative of that concern made a tour of the United Kingdom, Holland, Belgium, Switzerland, Italy and France, remaining abroad until October of that year. On Sept. 15, 1921, Mr. Macleod was appointed executive secretary of the Massachusetts Emergency Fuel Committee.

The F. W. Pray Coal Co., Boston, was recently incorporated to engage in the coal business. The capital stock is $50,000 and the incorporators are Henry N. Berry, president; Ralph Crocker, Swampscott, Mass., treasurer.

The Central Coal Co., Lowell, is a recent incorporation, to engage in the coal business, with a capital stock of $100,000. The firm will conduct yards at Lowell. The president is John F. Cunha, and the treasurer, Edward F. Cunha, of Lincoln Park, Somerville, Mass.

MINNESOTA

A representative of the Combustion Engineering Co., of New York, addressed a joint meeting of the St. Paul and Minneapolis chapters of the American Society of Mechanical Engineers last week on **pulverized fuel and lignites.** He predicted that pulverized fuel would be the coming fuel for industry, and said that lignite might cut a considerable figure in fuel in this market if certain processes under experiment were perfected. **Three carloads of North Dakota lignite are to be tested out in two stations of the St. Paul Gas Light Co.** on underfeed stokers and traveling grates, to determine its effectiveness. The tests will be carefully watched by many who hope that lignite will prove to be an available fuel for the Twin Cities. The gas-light company has a new plant under construction which will go into service next season that will use pulverized fuel. It can use lignite or peat, if tests shall prove either of these to be satisfactory as a commercial proposition. Both will be tried in the new plant, when it is completed and in operation.

MISSOURI

Coal mines in Randolph, Lafayette, Henry, Johnson and Morgan counties, where some of the largest pits of the state are located, **will be benefited by the decision of the Missouri Public Service Commission, which has ordered a reduction of 17c. a ton in intrastate rates on coal.** The present rate of 97c. a ton is reduced to 80c. The decision was returned in the appeal of Edward Aull Coal Co., of Lafayette County, which charged that the present rates were excessive and discriminatory in favor of interstate traffic. The action for reduction was brought against the Atchison, Topeka & Santa Fe, The Frisco, Burlington, Chicago & Alton and Missouri Pacific Railroads.

MONTANA

The Northern Pacific RR. announces that it will build a new line from the Rosebud district to Forsyth, Mont., a distance of 34 miles, at a cost of $2,000,000. It will make semi-bituminous coal deposits available for open-pit mining.

NEW YORK

Former Congressman Charles B. Smith, as one of the receivers of the L. R. Steel Co., on returning to Buffalo from Montgomery County, Virginia, where he went to inspect the mines of the **Merrimac Anthracite Coal Co.,** which is a Steel Company promotion, expressed himself as favorably impressed with conditions there and thinks the company may prove to be solvent and capable of achieving final success.

Foote Bros. Gear & Machine Co., Chicago, **have moved** their New York office from 145 Greenwich St. to **larger quarters at 100 Greenwich St.** J. R. Shays, who has represented the company for many years, remains in charge of the New York office.

Senator Downing, of New York city, has introduced in the New York State Legislature **a bill** (Senate Print No. 2,134) **appropriating $10,500 for plans and specifications for constructing tipples** for coal at Ithaca and Watkins with a view to facilitating transportation and delivery of coal within the state and utilizing the barge canal for that purpose.

OHIO

The Kearns Coal Co., Cincinnati, has been incorporated with a capital of $200,000 for the purpose of mining and selling coal and coke both at wholesale and retail. Incorporators are G. M. Kearns, U. B. Buskirk, Howard N. Ragland, R. H. McCormick and Carl T. Foley.

The Joan Collieries Co., Marietta, has been chartered with a capital of 500 shares, no par value, designated to mine coal. Incorporators are E. H. Wigginton, H. G. Healop, R. M. Noll, Benjamin E. Jones and John Jones.

The Euga Coal Co., New Lexington, has been chartered with a capital of $5,000 to mine coal in the Hocking Valley. Incorporators are: J. A. Curtis, R. F. Roberts, M. Herstam, and E. Holwick.

The Landson Coal Co., of Hopedale, has contracted with the Roberts & Schaefer Co., for the complete erection of a new tipple at its stripping operation at Hopedale.

The Cincinnati Chamber of Commerce **will conduct a trade excursion** to points on the Norfolk & Western in West Virginia, down the Big Sandy and into the Hazard and Harlan coal fields as a means of strengthening the bonds between the city's merchants and distributors and the coal fields to the south and east.

C. D. Boyd, traffic manager for the Hazard Coal Operators Association and the Southern Appalachian Operators Association addressed the traffic committees of both associations at a meeting held at the Hotel Gibson, Cincinnati, on April 17. Many matters were gone over relating to tariffs, traffic and rates, but the matter that received the most attention was the controversy on rates between the Illinois shippers and the dock operators at the head of the lakes over Minnesota tariffs. Both associations decided to keep out of the discussion on the ground that this was "not their fight."

PENNSYLVANIA

The Diamond No. 3 Mine, located at Grove City, on the Bessemer & Lake Erie R.R., has been purchased by the Bixler Coal & Coke Co., of Pittsburgh, which company intends to install modern equipment and operate the mine to its full capacity.

The Central Cambria Coal Mining Institute was organized April 12 in the public school building at Portage. The purpose and aim of the organization was discussed and the following officers elected: President, Dennis J. Keenan, of the Portage Wilmore Coal Co.; First Vice-President, Thorne Murphy, of the Sonman Shaft Coal Co.; Second Vice-President, James R. Cunningham, of the Forge Coal Mining Co.; Third Vice-President, Frank J. Burke, of the Sonman Shaft Coal Co.; Secretary, Jerome C. White; Treasurer, Leo M. Cronaur. The election of a Board of Directors was left until the next meeting. A committee on bylaws and constitution was elected and ordered to report at the next meeting. The institute has for its purpose to foster a better fellowship among those interested in the mining industry, to study and discuss the problems of the industry with a view toward their practical solution; to assist in accident prevention, to help collectively and individually to make a safe industry for those whose lives are given to this work, and to assist in educational work both for its members and mining men in general.

Schuylkill County Commissioners on April 13, forced an immediate issue with coal companies who have refused to pay a 1,000-per cent increase in coal-land taxation, by ordering the tax collectors to levy immediately upon and sell breakers, horses, coal, mules and coal cars, and even railroad cars where the tax increase has not been paid.

The Colonial Coal & Coke Co., Pittsburgh, has been appointed sole **selling representative of the Maple Furnace Coal Mine,** owned by the Argentine Coal Mining Co. The combined output of the North East Coal Mining Co., the Standard Coal Mining Co. and the Argentine Coal Mining Co., makes the Colonial company the largest shipper in Group 1 on the Bessemer. The company's coal is produced under the personal supervision of Harris T. Booker, formerly general manager for the Berwind White Coal Mining Co.

The Board of Education of Philadelphia on April 10 **approved the awarding of contracts for furnishing coal** for the school buildings for the ensuing year, at the following prices: Egg, stove and chestnut, $10.67 per ton; pea coal, $8.14, and buckwheat No. 1, $5.44. Hauling of anthracite is to cost from 90c. to $1.47 per ton. For furnishing bituminous coal the prices range from $8.36 to $8.40 per ton.

A well-defined break has appeared in the ranks of the United Mine Workers in the Ninth district, of which C. J. Golden, of Shamokin, is president, according to the *Wilkes-Barre Leader.* Representative of forty-five locals met at Ashland recently and went on record as opposing the institution of the colliery local plan, which is being put in force by the district officers. A committee representing these insurgent locals, issued a statement April 14 in which they declared their intention to resist every effort to change the present system. The insurgents admit that the colliery local plan passed the Shamokin convention by an aye and nay vote, but contend that when the plan was submitted to a referendum vote, it was defeated by at least 800 votes. Action of the District officers in throwing out votes sent in by locals opposed to the plan because returns were not made within the time specified, lost that number of votes to the antis, they claim.

The House on April 16 passed the O'Boyle bill requiring owners and operators of coal mines and operations to furnish and sell coal at current or market prices to hospitals, poor houses, schools, churches and municipal buildings. Representative Edmonds, Philadelphia, asked the sponsor of the bill the purpose of the measure and was told that during the coal shortage of the past winter the Delaware & Hudson Coal Co. would not sell coal at any price to a hospital and a school building near its operations in Lackawanna County. There was no opposition voiced on the floor of the House to the measure.

A bill authorizing the Chief of the Department of Mines to appoint a Mine Inspectors' Examining Board was introduced in the Senate April 17 by Senator George Woodward, Philadelphia. The board is to be composed of two mining engineers who have had experience in the anthracite district and two who have had similar experience in the bituminous mines, two who shall have passed examinations qualifying them as inspectors or mine foremen in the anthracite mines and two who have been qualified for similar positions in the bituminous mines. The minimum age limit of members of the board is thirty years. Mine inspectors are now named by the Governor.

Senator Buckman, Bucks County, offered a bill in the Senate April 16, amending an act of 1881 to provide that all domestic corporations and all foreign corporations which have at any time been registered in the Commonwealth, organized for mining, manufacturing or trading purposes, whether created by general or special laws, whose charters have expired or may hereafter expire or may be dissolved, which at the time of the expiration of the charter or dissolution are owners or holders of record of property in Pennsylvania, **may sell the property and make title as effectually as if their charters had not expired.**

The House on April 12 passed finally the first of the series of bills affecting the coal industry of Pennsylvania. It was the Post measure, which is intended to **relieve life tenants of land from the payment of taxes on the underlying veins of coal which they have no right to operate.** The bill provides that such coal shall be assessed to and the taxes on it paid by the owner of the coal. The bill was sent to the Senate this week.

Joseph J. Walsh, Chief of the Bureau of Mines and Mining, announces that but **eight examinations of candidates for certificates as mine foremen and assistant mine foremen will be held** in the anthracite region this spring because of lack of funds. In other years twenty-two boards sat in various parts of the region. The examinations will be held on April 30 and May 1 at the following places, and with the following acting as chairman of each board, consisting of the inspector, a mining engineer and two experienced miners: Carbondale—P. J. Moore, districts 1 and 2. Scranton—David T. Williams, districts 3, 4, 5, 6, 7. Wilkes-Barre—David T. Davis, districts 8, 9, 10, 11, 12, 13, 14. Hazleton—D. J. Roderick, districts 15 and 16. Coaldale—E. G. Evans, 17 and 18 districts. Pottsville—M. J. Brennan, districts 19, 20 and 21. Shamokin—P. J. Friel, 22, 23 and 24th districts. Lykens—Charles J. Price, 25th district. Instead of taking the examinations in their respective mine inspection districts candidates will have to appear before the boards as per the above schedule.

Joseph J. Walsh, of Wilkes-Barre, who has been serving as chief of the Bureau of Mines and Mining since Governor Pinchot took office, was **named by the Governor for a full term of four years** commencing April 17. The appointment was immediately confirmed by the Senate, the action being unanimous.

Fire, the origin of which has not been determined, on April 13, **gutted the entire upper half of the washery of the Lackawanna Valley Fuel Co.,** in the Pine Brook section of Scranton. Destruction of the entire wooden frame structure was prevented only by effective work on the part of the firemen. The loss is estimated at between $12,000 and $15,000.

Berne H. Evans, of Harrisburg, was the only speaker at the Senate judiciary general subcommittee hearing on the Joyce compensation bill at Harrisburg, on April 17. He represented the Pittsburgh Coal Producers' Association, the Central Pennsylvania Coal Producers' Association, most of the large producers of anthracite and many other large employers of labor. **These interests, he said, are unqualifiedly opposed to the bill, which will raise the maximum compensation to $20 a week** and base the compensation on 66⅔ per cent of the weekly wage. The present law has resulted satisfactorily, he said, for it has been humane to both labor and industry. Roger Dever, attorney for the anthracite mine workers; Thomas J. Kennedy, District 7, United Mine Workers, and J. B. Crumrine, District 5, spoke for the measure.

Contract miners at the Jeddo No. 4 and 7 collieries of the Jeddo Highland Coal Co. struck April 14 in a renewed **demand that they receive their wages on pay days at 2 p.m.** when they come from the workings, instead of being obliged to wait until 3:30, when the pay windows open. Both places were tied up and 600 men were idle. The men, it was stated by their leaders, would remain idle every pay day unless the hour for the wage distribution was changed.

RHODE ISLAND

Colonel George H. Webb, Fuel Administrator for Rhode Island, in his report to Governor Flynn **says that in no case has any dealer been found to have charged a customer more than $16 per ton for coal which did not warrant the charge,** and cases were found where coal selling at $19 and $20 per ton showed no profit to the dealer. "If the federal government," said Colonel Webb, "will correct the basic cause of the fuel conditions which periodically threaten the public welfare and health, protective state law can easily correct such unfair practices as may arise from time to time within the state." The report states that retail prices for coal were based on prices paid by the dealers, which ranged from $8 to $14.95 per gross ton f.o.b. at the mines. Sixty-five per cent of the coal was company coal, supposed to be sold from $8 to $8.50, and 35 per cent was independent coal, costing as high as $14.95 and inferior in quality to the $8 coal.

UTAH

The Carbon County R.R., being built for the Columbia Steel Corporation, to open coal deposits in Horse Canyon, **is expected to be ready for service the first week in May.** Work at the mine is under way and it is probable that coal will be produced on a commercial basis by August 1. The coke oven and blast furnaces should be ready early next year. Pig iron ought to be produced by Apr. 1, 1924.

Thomas E. M'Kay has been made president of the Utah State Public Utilities Commission. He was president of the Senate for two terms. He is a resident of Huntsville and a prominent church man in that section.

WEST VIRGINIA

Carrying a provision that it should be considered only as an emergency measure and should be in effect only for the next two years, House Bill 149—**the Zimmerman bill—imposing a privilege tax on the production and sale of coal** and other mineral products as well as on manufacture and sale of tangible property, sales at retail, a tax on the gross profits of wholesalers, a tax on the gross income of banks, railroads and other public utilities and on engaging in business, was reported to the House of Delegates on Tuesday, April 17, by the Finance Committee of the House. The measure as reported provides for an increase in the rate on coal, oil and gas from two-fifths of one per cent under existing law to 1 per cent.

During consideration of the **Helmick bill creating the West Virginia School of Mines which passed the State Senate** April 17, by a vote of twenty-four to two, the only discussion of the bill arose over the question of location, Senator Kidd, of Gilmer, stating that he was in sympathy with the measure but he asked if it should not be located at the University. He was assured by Senator Helmick, patron of the measure, that the bill created a commission of five to decide upon the proper location for the school especially with a view to avoiding duplication.

A bill designed to abolish the state police in West Virginia was removed from further consideration for two years by the Legislature when the House voted definitely April 18, **to postpone action on the measure.** Proponents of the measure declared the act creating the state police set up "a military regime," while its opponents contended the troopers were not a military force.

Clarksburg capitalists have launched the Bailey-Spraker Coal Co. for the purpose of mining coal in the Harrison County field, this company being capitalized at $25,000. The general office of the company will be at Clarksburg. Largely interested in the new concern are K. D. Bailey, C. F. Bailey, E. L. Spraker, Anna May Spraker and Harry W. Sheets, all of Clarksburg.

WISCONSIN

The Valley Coal and Dock Co. has purchased 500 ft. of dock frontage on the Menominee River at Milwaukee, and will proceed to equip it with facilities for unloading vessels and otherwise handling coal. Until the necessary machinery is installed coal will be discharged on the dock by self-unloading steamers. The company contemplates adding to its frontage in the near future.

The State Fuel Administration of Wisconsin is **investigating the sales methods of a Chicago coal company** which advertises that it will save "special agents" in Wisconsin from $1.50 to $2 per ton on coal and pay 75c. per ton commission on all sales. The company advertises that working agents without investment or experience should be able to earn from $100 to $200 per week as its representative. The Fuel Administration demands to know the name of the mine and operating company, and the shipping point.

A bill to increase the occupational tax on coal handled over docks in Wisconsin, now before the Legislature of that state, would increase from 1½c. to 2½c. the tax per ton on bituminous coal, and from 2c. to 3c. per ton the tax on anthracite. The measure is discriminatory in that it does not apply to coal received direct by rail.

WASHINGTON, D. C.

Bids are solicited for the transportation of four cargoes of Navy coal from Hampton Roads, Va., to the destinations specified below, in vessels of American registry. The destinations, guaranteed daily rate of discharge, cargoes required and approximate loading dates at Hampton Roads are as follows: 7,500 tons to Puget Sound Navy Yard; 5,000 tons to Portsmouth (N. H.) Navy Yard; 7,500 tons to San Diego (Cal.) Naval Fuel Depot, and 5,000 tons to Boston Navy Yard. Proposals, which should be submitted to the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., will be opened at noon May 3.

Chambers of Commerce have indorsed trade associations for each important branch of industry in a referendum concluded by the national organization. Eight propositions were voted on, all of which were carried by large majorities, the negative votes being in five cases less than 100, and in 3 cases less than 300. It was voted that trade associations should be free from special forms of government control; that statistics of capacity, production, stocks, and sales should be collected, as well as statistics of acual prices in closed transactions but that any interpretation of statistics or other comment which would induce or facilitate concerted action by members should be omitted. It was also voted that statistics should be made available to the public and to government agencies.

"One of the first things Congress will try to regulate," said Representative Bacharach of New Jersey, "when we return next year, will be the question of coal. It is a well known fact that we had a coal commission that accomplished nothing worth while. I was strongly opposed to the government sending coal to Canada and other ports, while we ourselves were suffering from the shortage of fuel. There is hope, and I sincerely wish that it comes true, that **there will be a commission appointed at the next Congress** that will relieve the situation and do something for the benefit of the suffering public and not worry about other countries. **We should have a sales tax** and I am the sponsor of the movement and one of its heartiest supporters. At the present time, no matter what way you try to get around it, any tax you put on the rich man the poor man pays. Since this tax has been advocated eighteen states throughout the country have passed like taxes, and each has been successful. The tax prevents confusion and worry about the income tax."

J. F. Callbreath, secretary of the American Mining Congress, **will leave about May 1 for a tour of the West.** It is probable that Mr. Callbreath will address the National Foreign Trade Council in New Orleans May 2 or 3 on the silver situation, and the inquiry into that subject by a Senate committee. He will speak at the commencement exercises of the Colorado School of Mines May 18, and will make one or two other addresses before leaving that state; will attend the convention of the Northwestern Mining Association at Spokane, May 22-26, and will attend a meeting of the Board of Governors of the Western Division of the American Mining Congress at San Francisco, June 11-13.

CANADA

Production of coal in the province of Alberta is showing an increase. Last January 245,300 tons more were mined than in the corresponding month last year. The total output for January, 1923, was 845,806 tons, of which 347,673 tons is classified as domestic, 74,457 tons sub-bituminous and 423,676 tons bituminous. In January, 1922, there were produced 312,871 tons of domestic, 30,989 sub-bituminous, 246,788 bituminous and 9,858 anthracite. In January, 1922, some 829 tons of domestic were shipped to Ontario while in January of this year the export to that eastern province totalled 5,239 tons. Shipments to adjacent provinces also are growing so that it is clear that the campaign being carried on by the Alberta Collieries, assisted by the authorities of the provincial and federal governments, already is bringing results.

Minister of Mines Sloan has issued a statement **favoring the use of the new "self-rescue" gas mask** for miners if that little device, recently put on the market in the United States, fulfills expectations. It is a small tin can with a mouthpiece and a nose clip. A miner easily can carry it in his pocket. It is calculated to give 70 minutes protection against a considerable percentage of carbon dioxide but will not, of course, replace oxygen equipment, as it cannot be used in an atmosphere completely robbed of oxygen, as by a serious explosion.

Traffic News

Railroads of the country on April 1, 1923, had 50,107 serviceable locomotives, the largest number the railroads have ever had, according to the American Railway Association. Locomotives in need of repair on that date numbered 14,452, or 22.4 per cent of the total number on line. This was a decrease of 1,179, compared with the total on March 15, at which time there were 15,631, or 24.2 per cent. The total number in need of repair on April 1 was practically equivalent to July 1, 1922.

A total of 8,242 new freight cars of various classes and **208 new locomotives** were installed in service by the railroads during the semi-monthly period from March 15 to April 1 according to reports just filed by the carriers with the American Railway Association. This brought the total number of **new freight cars installed from Jan. 1 to April 1, 1923, to 39,172,** while **935 locomotives** were placed in service during the same period. **New freight cars on order on April 1 totaled 107,453,** or an increase of 1,117 over the total number on order on March 15. There were also 1,974 locomotives on order on April 1 compared with 2,113 on March 15. Of the total number of freight cars put in service during the first three months this year, 14,895 were coal cars.

The membership of the **Board of Directors of the Chesapeake & Ohio Ry. was increased from nine to eleven** at a meeting of the stockholders at Richmond, Va., April 17. A. Colston, Cleveland, and Walter L. Ross, Toledo, were elected to the new places. The other members of the board elected at the meeting are O. P. Van Sweringen, chairman; M. J. Van Sweringen, J. J. Bernett, C. L. Bradley, H. M. Hanna Jr., Otto Miller and J. R. Nutt, all of Cleveland; W. J. Harahan, Richmond, and W. J. Louderback, Chicago.

The Interstate Commerce Commission, on April 21, ordered **Service Order 22 vacated and set aside,** effective at midnight April 22, 1923.

It has been definitely announced that **the Virginian Ry. will be electrified from Mullens, W. Va., to Roanoke** and that contracts for the work will be awarded soon. The road will install motors of the largest capacity and will make every provision for the most modern system of electrification. It will take about a year and a half to complete the work, but by Jan. 1, 1925, officials of the road expect it to be able to handle about 12,000,000 tons of coal annually.

A refund of certain demurrage charges paid by the Republic Coal Co., of Minneapolis, was ordered.

The Interstate Commerce Commission holds that rates on **coal from Willard, Ky., to certain destinations in Kentucky, during February control, were unreasonable,** as was the rate on certain shipments to Cincinnati. The carriers were instructed to pay reparation to the Willard Coal Co. and to the Drayer Coal Co.

The Kanawha Central Ry. is a common carrier, according to a formal opinion rendered by the Interstate Commerce Commission. The line is the property of the Black Band Consolidated Coal Co. Its only connection is with the Chesapeake & Ohio at Brounland. In the same opinion the commission holds that **rates on coal from mines on the Kanawha Central to interstate destinations are unreasonable** to the extent that they exceed the group rates on like traffic from other mines in the Kanawha district which are served by the Chesapeake & Ohio. The commission expresses the opinion, however, that the **Kanawha Central should receive a greater proportion of through rates.** It is suggested that the two lines make an effort to agree on reasonable and proper divisions.

The Sturgeon Grain & Coal Co., of Muncie, Ind., has **attacked the rates on bituminous** coal from Springfield, Ill., to Muncie.

The Valley Camp Coal Co., of Cleveland, has filed a complaint **assailing the rates on coal** from mines in the Moundsville district of West Virginia to Lorraine, Ohio, for transshipment to Superior, Wis.

Consolidation of five Middle Western railroads under the direction of the Van Sweringen interests of Cleveland, was **officially consummated** April 12, when incorporation papers for the consolidated road, which will be known as the New York, Chicago & St. Louis, were filed with the Ohio Secretary of State at Columbus. Railroads which under the merger are brought together into one system are the New York, Chicago & St. Louis, Chicago & State Line, Lake Erie & Western, Fort Wayne, Cincinnati & Louisville and the Toledo, St. Louis & Western. Officers of the company include O. P. Van Sweringen, Cleveland, chairman of the board; J. J. Bernett, Cleveland, president; Walter L. Rees, Toledo, senior vice president; M. J. Van Sweringen, Cleveland, J. R. Nutt, Cleveland; C. L. Bradley, Cleveland, Otto Miller, Cleveland; John Sherwin, Willoughby; C. E. Denney, Cleveland, and W. A. Colston, Cleveland, vice presidents; George A. Ross, Toledo, secretary and L. B. Williams, Cleveland, treasurer.

Obituary

Joseph Meister, prominent coal operator of eastern Ohio and West Virginia, died on April 11, at his temporary residence 45 Zane St., Wheeling Island. He was in his fiftieth year and had resided in Bridgeport practically all of his life. He was president and owner of the Meister Coal Co. and officially connected with other mining operations in Ohio and West Virginia. He also was a director of the Bridgeport National Bank and a member of the Pittsburgh Vein Operators Association of Ohio. At the time of his death he was a member of the Bridgeport Council and had been a candidate for mayor. He was one of the benefactors of the Meister band, one of the best-known and most successful organizations in the Tri-state district. Mr. Meister was himself a talented musician.

R. C. M. Hastings, aged 56, president of the Crab Orchard Mining Co., which operates coal properties at Freeport, in Harrison County, Ohio, died suddenly last week at his home in Columbus, from heart trouble. He had been a resident of Columbus for about 12 years and was also in the telephone business. He leaves a widow and three daughters. Interment was at Athens, his former home.

John S. Hobson, 59 years of age, salesman for the Gulf Refining Co., Louisville, and for twenty years sales manager for the old Central Coal & Iron Co. mines, at Central City, Ky., recently died at his home in Louisville, where he has been living for the past nine years.

James S. Kuhn, 55, president of the Devoy & Kuhn Coal Co., wholesalers, died suddenly at his home in St. Louis of heart failure, April 12. For 31 years he had been connected with the Devoy & Kuhn company, which specialized in railroad fuels. Besides a widow he leaves two married daughters.

Edward Lippincott Bullock, mining engineer and former superintendent of the Dodson and Lehigh & Wilkes-Barre mining operations in Luzerne and Schuylkill Counties, died at his home at Hazelton April 8. He was 79 years old.

Association Activities

Cleveland Wholesales Distributors Association

The Cleveland Wholesale Distributors Association held its annual frolic on Wednesday evening, April 11, at Grove Hill, a popular summer resort just east of Cleveland on the shores of Lake Erie. About 150 of Cleveland's leading coal jobbers were present and addresses were made by the officers. Roy S. Bain, sales manager of the Central Coal Mining Co., is president of the association and Eugene Astel, of the Astel Coal Co., is vice president.

Baltimore Coal Exchange

The banquet of the Baltimore Coal Exchange held last week was addressed by William M. Maloy, chairman of the Public Service Commission and former chairman of the State Fuel Distribution Committee; A. S. Goldsborough, managing director of the Merchants & Manufacturers Associations; Walter R. Hough, Fire Commissioner and publisher, and Charles B. Crockett. J. Harry West was toastmaster. Hugh C. Hill is president of the exchange. Mr. Maloy predicted the coming of a form of regulation to the coal trade by governmental agency, but said that be believed that it would have a stabilizing effect which would be beneficial to the retail dealer rather than destructive to his interests.

Coming Meetings

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting May 23 and 24 at Wilmington, Del. Secretary, W. M. Bertolet, Reading, Pa.

American Association of Mechanical Engineers will hold its spring meeting at Montreal, Quebec, Canada, May 28-31. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

National Association of Purchasing Agents will hold its eighth annual convention and Informashow at Cleveland, Ohio, May 15-18. Convention headquarters, room 219, Hotel Winton, Cleveland.

The National Association of Manufacturers will hold its 27th annual convention at the Waldorf-Astoria, New York City, May 14-16.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24, Secretary-treasurer, J. G. Crawford, Chicago.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Michigan-Ohio-Indiana Coal Association will hold its annual convention at the Hotel Sinton, Cincinnati, Ohio, May 22-24. Secretary, B. F. Nigh, Brunson Bldg., Columbus, Ohio.

West Virginia Coal Mining Institute has tentatively set June 5 and 6 for its annual meeting, to be held at Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.